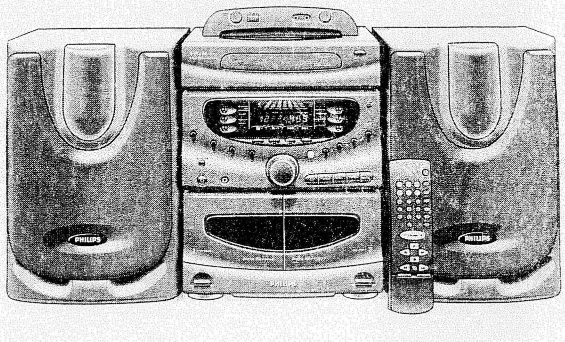
Mini System

FW630

/21/22/34/41

Service
Service
Service



Service Manual

COMPACT disc DIGITAL AUDIO

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CLASS 1
LASER PRODUCT

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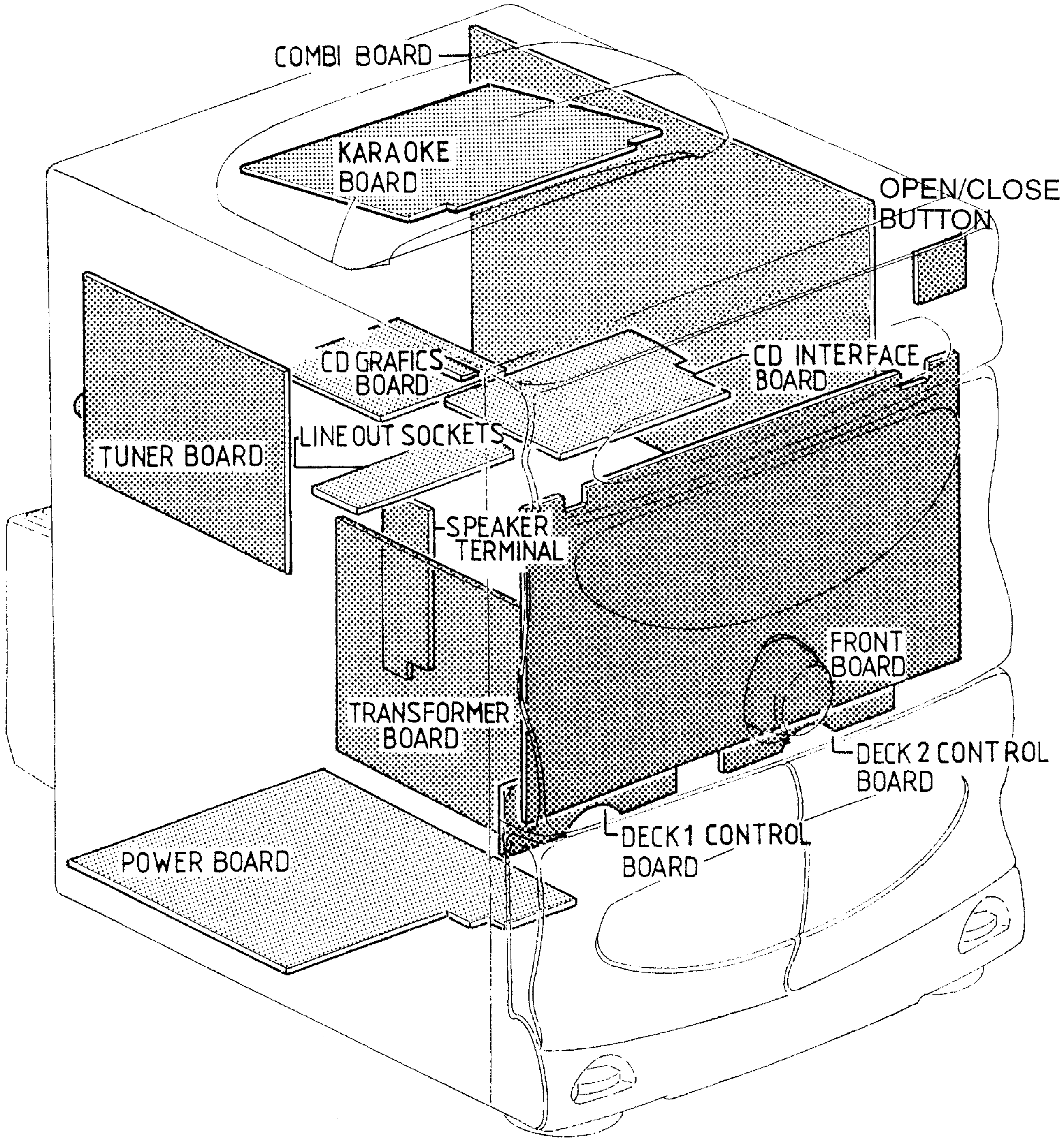
CS 52 300

PHILIPS

LOCATION OF PRINTED CIRCUIT BOARDS


COMBI BOARD
KARAOKE BOARD
OPEN/CLOSE BUTTON
TUNER BOARD
CD GRAFICS BOARD
CD INTERFACE BOARD
LINE OUT SOCKETS
SPEAKER TERMINAL
FRONT BOARD
TRANSFORMER BOARD
DECK 2 CONTROL BOARD
DECK1 CONTROL BOARD
POWER BOARD

CD GRAPHICS BOARD not on all versions
KARAOKE BOARD not on all versions

TECHNICAL SPECIFICATION

General:

Mains voltage : 230V / 50Hz for /22 and /34
: 110-127V / 220-240V switchable for /21 and /41

Power consumption : ≤150W at maximum output power
: ≤3W in power off mode

Amplifier:

Output power : 2 x 40W at 6Ω D=10%
Music power : 2 x 70W at 6Ω
Headphone : 3,5mm stereo jack 2,5V EMF

Power stage protection : Shortcircuit, AC, DC, Temperature

Frequency response : 63 Hz - 20kHz (-3dB) Limit

Input sensitivity
AUX/LINE : 500mV
Microphone : 2,5mV

Equalizer:

60Hz : ± 6dB
1kHz : ± 6dB
12kHz : ±6 dB

Tuner:

FM
Tuning range : 87,5 - 108MHz
Grid : 50kHz
Aerial input : 75Ω Coax
: 300Ω Click fit for /37
IF : 10,7MHz ± 25kHz
Sensitivity Mono 26dB S/N : ≤ 1,7µV
Sensitivity Stereo 46dB S/N : ≤ 45µV
Sensitivity Search tuning : ≤ 7µV
Distortion at RF=1mV, Δf=75kHz : ≤ 7% (2% typ.)
Channel separation : ≥ 26dB (30dB typ.)
Immage rejection ratio : ≥ 30dB (70dB typ.)
3 dB limiting point : ≤ 2µV (1,5µV typ.)

MW
Tuning range : 522 - 1611kHz
: 530 - 1710kHz for /37
Grid : 9kHz
: 10kHz for /37
Aerial input : Ferrite antenna
IF : 450kHz ± 1kHz
Sensitivity : ≤ 2mV/m
Distortion at RF=100mV, m=80% : ≤ 5% (3% typ.)
Immage rejection ratio : ≥ 27dB (30dB typ.)

LW (not for 2 band versions)
Tuning range : 153 - 279kHz
Grid : 3kHz
Aerial input : Ferrite antenna
IF : 450kHz ± 1kHz
Sensitivity : ≤ 5 mV/m
Distortion at RF=100mV, m=80% : ≤ 5% (3% typ.)
Immage rejection ratio : ≥ 40dB (43dB typ.)

CD unit:

Have to be measured direct on internal connector 1300

Frequency response : 20 - 20.000Hz ±2dB
Output level : 2V ±3dB
Signal/noise ratio : 90dB
Distortion : < 1% at 1kHz
Channel difference : < 2dB at 1kHz
Channel crosstalk : 50dB max.
De emphasis : 0 or 15/50 µs
Laser
Output power : ≤ 500µW
Wave length : 780nm ± 20nm

Recorder part:

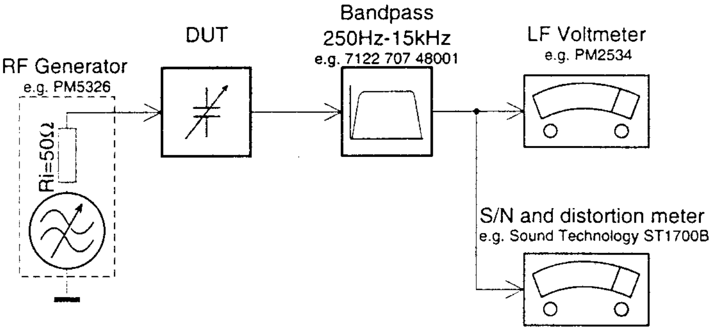
Tape speed : 4,76cm/s ±2%
Wow & Flutter : ≤ 0,4%
Winding speed : ≤ 130s for C60 cassette
Erase / Bias system : AC 80kHz ± 5kHz
RIF-shift : service solution on request
Distortion at 200 nWb/m : ≤ 3%
Channel difference at PB : ≤ 3dB
Channel difference overall : ≤ 3dB
Channel separation : ≥ 18dB at 1kHz
Track separation : ≥ 55dB at 1kHz
ALC attack time : ≤ 15ms
ALC recovery time : ≥ 50s

Frequency response : 60Hz - 14kHz within 8dB
Signal to Hiss ratio[1] : typ 52dB with Fe
: typ 54dB withCrO_2
Signal to Noise ratio[2] : typ 47dB with Fe
: typ 47dB withCrO_2
Erase attenuation[3] : ≥ 62dB

[1] at 250 nW/m A-weighted
[2] at 250 nW/m FF-weighted
[3] use a 1kHz passfilter to minimize the wide band noise component.

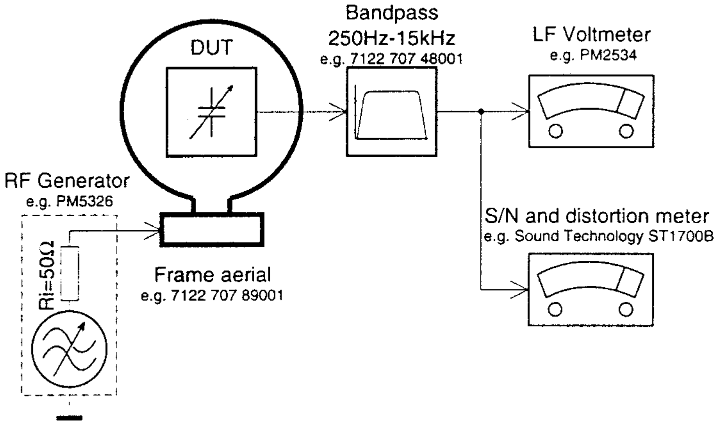
MEASUREMENT SETUP

Tuner FM


Bandpass
250Hz-15kHz
e.g. 7122 707 48001
DUT
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
S/N and distortion meter
e.g. Sound Technology ST1700B

Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

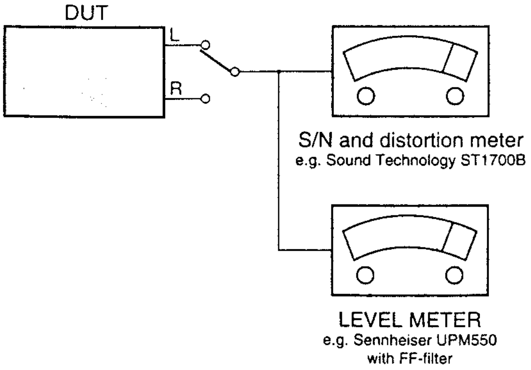
Tuner AM (MW,LW)


Bandpass
250Hz-15kHz
e.g. 7122 707 48001
DUT
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
S/N and distortion meter
e.g. Sound Technology ST1700B
Frame aerial
e.g. 7122 707 89001

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

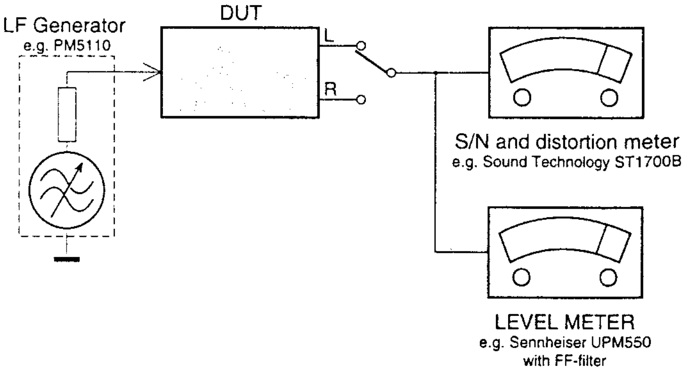
CD

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)


DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

RECORDER

Use Universal Test Cassette **CrO$_2$** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071


LF Generator
e.g. PM5110
DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

RC5 SYSTEM/COMMAND CODES

Remote control key	System Code	Command Code
Standby	17, 18, 20	12
Stand by pressed longer than 1sec	00, 04, 05	12
Tuner	17	63
Tuning up	17	30
Tuning down	17	31
Preset up	17	32
Preset down	17	33
Preset 10 key	17	00-09
CD	20	63
CD Play	20	53
CD Stop	20	54
CD Pause	20	48
Preset 10 key	20	00-09
CD Next	20	32
CD Previous	20	33
CD Search forward	20	52
CD Search backward	20	50
CD Disc	20	30
Tape1	18	44
Tape2	18	46
Side	18	47
Tape Play	18	53
Tape Stop	18	54
Tape Wind	18	52
Tape Rewind	18	50
Tape Pause	18	48
Incredible Sound	16	64
DBB	16	70
DSC	16	79
Volume up	16	16
Volume down	16	17
Vocal Fader 1)	16	67
Key control up1)	16	68
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Multi media	04	63

1) For sets with KARAOKE only

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- SHUFFLE – playing in random order
- Programming track numbers

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Thank you for selecting this Philips system

This state-of-the-art mini stereo system offers you the latest technology, high quality sound and an extreme user-friendly operation thanks to its large display which contains advanced interactive user interface.

Supplied accessories

- 2 loudspeaker boxes, type LSB 650
- 2 loudspeaker cables
- Remote control
- Two batteries (AAA cells) for the remote control
- AC mains lead
- AM/MW frame aerial
- FM wire antenna 75 Ohms

Demo mode

The system has a demo mode, showing various features offered by the system.

1 To switch on the demonstration mode, press DEMO.
 ► The display demonstration starts with the message: "WELCOME TO THE AUDIO WORLD".

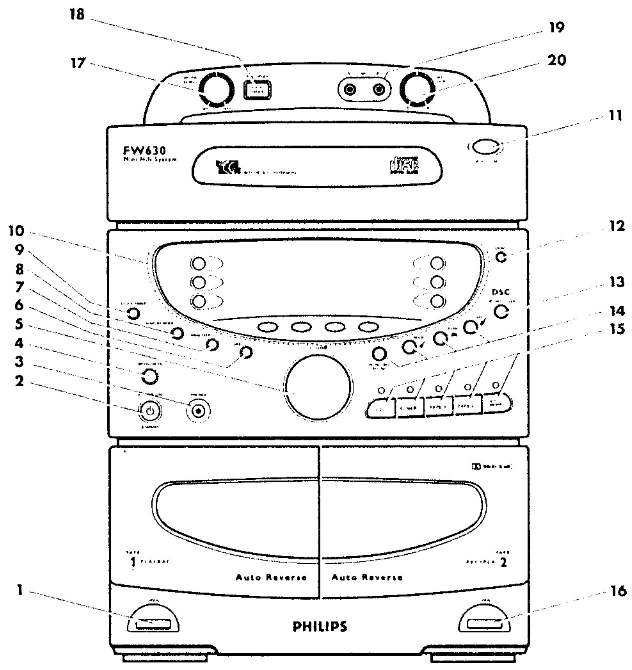
2 To leave the demonstration mode, press DEMO or POWER ON/STANDBY.

Environmental information

All unnecessary packaging material has been omitted. We have done our utmost to make the packaging easily separable into three mono-materials:
- cardboard (box)
- expandable polystyrene (buffer)
- polyethylene (bags, protective foam sheet)

Note: Your set consists of materials which can be recycled if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packing materials, exhausted batteries and old equipment.

CONTROLS

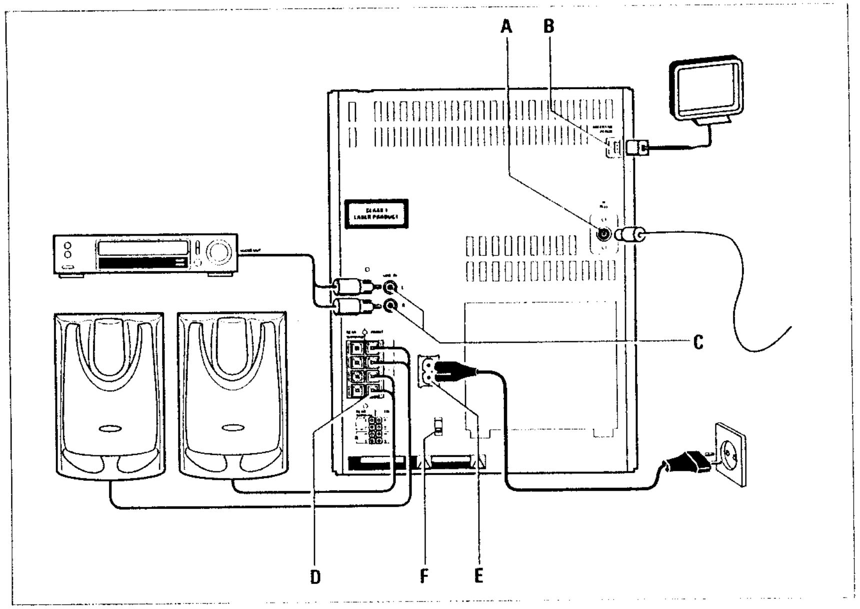


Top and front panel

1 **OPEN** .... to open the cassette compartment of deck 1
2 **POWER ON/STANDBY** – to switch the set on and off
3 **PHONES** .... 3.5 mm headphones socket
Inserting the plug will disconnect the speakers.
4 **BRIGHTNESS** .... to adjust the intensity of the display illumination
5 **VOLUME** .... to adjust the volume level
6 **DBB** .... Dynamic Bass Boost: to increase the bass level
7 **ANALYZER** .... to switch the spectrum analyzer on and off
8 **DISPLAY MODE** to change the type of display information for the selected source
9 **CLOCK·TIMER**.... to select the clock/timer function
10 **System display and buttons**
11 **OPEN·CLOSE** .... to open and close the CD tray
12 **DEMO** .... to switch on and off the demonstration mode
13 **OPTIMAL·USER Digital sound control/setting button**
to select the desired equalizer setting:
OPTIMAL→USER 1→USER 2→OPTIMAL→...
14 **Digital sound control buttons:**
INCREDIBLE SOUND - ROCK - CLASSIC - JAZZ
to adjust the sound to your individual taste
15 **Sound source selection buttons**
CD .... to select the CD player
TUNER .... to select the tuner
TAPE 1 .... to select the left tape deck
TAPE 2 .... to select the right tape deck
MULTIMEDIA .... to select the multimedia mode (external sources, e.g. TV sound)
16 **OPEN** .... to open the cassette compartment of deck 2

Karaoke controls:

17 **DIGITAL ECHO** ... to adjust the echo level for the microphone signals
18 **VOCAL FADER** ... to scroll between the different options to fade out the vocal of the original song
19 **MIC** .... two 3.5 mm microphone sockets
20 **MIC LEVEL** .... to adjust the mixing level of the microphone signal



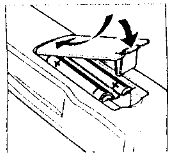
Before you start ...

- After unpacking the system, remove all protective material.

- ***Before connecting the system to the mains,*** check if the mains voltage as shown on the type plate corresponds to your local mains voltage. If it does not, consult your dealer or service organisation.
  If your set is equipped with a voltage selector, set this selector to the local mains voltage.
  The typeplate is located at the rear of the system.

- Place the system on a hard surface.

- Do not cover the vents and make sure that you leave sufficient room around the unit for ventilation.



Remote control:

- Open the battery compartment and insert the batteries supplied (type R03, UM-4 or AAA) as indicated.
- Remove the batteries if exhausted or if they will not be used again for a long period.

Connections

A **75 Ω** – Socket for a FM antenna, 75 Ohms.
Connect the supplied antenna wire with this socket. Find a position for best reception.
For good FM stereo reception, use an FM outdoor antenna or a connection to your house distribution system.

B **AM FRAME AERIAL** – Connector for the supplied AM frame antenna. Connect the plug of the AM frame antenna to this socket and position the frame antenna for optimum reception. Do not place the frame antenna too close to the units, the wires or the boxes, as this may cause unwanted noise.

C **LINE IN** – Input sockets (Left/Right) for connecting other sound sources (e.g. VCR, TV audio output etc.).

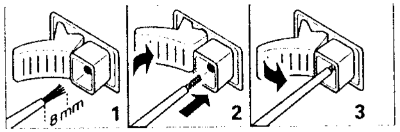
D **REAR/FRONT** – Terminals for four loudspeakers (see SPEAKER CONNECTIONS). Impedance of supplied loudspeakers is 6 ohms, if other front speakers are used, they should have at least 6 ohms.

E **MAINS** – Mains socket. After all other connections have been made, connect the mains lead to the MAINS socket and the wall socket.

F **220-240V/110-127V** – Set this voltage selector to the local mains voltage. If the selector must be reset, disconnect the mains lead first.

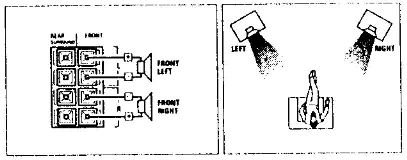
Speaker connections

You can connect the 2 supplied LSB 650 speakers or you can create a 4-speaker system for surround sound using two extra speakers having an impedance of at least 8 ohms, e.g. special surround-sound speakers, type PHILIPS SBC BS010.



2-speaker system

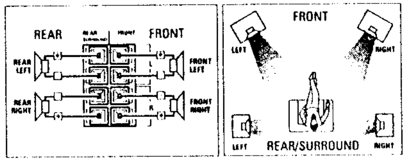
- Connect the black or non-marked wires to the black terminals and the red or marked wires to the red terminals.



4-speaker system

- ***Front speakers LSB 650 (&1):*** Connect the black or non-marked wires to the black FRONT terminals and the red or marked wires to the red FRONT terminals.

- ***Surround speakers, e.g. SBC BS010 (&1):*** Connect the black or non-marked wires to the black REAR terminals and the red or marked wires to the red REAR terminals.

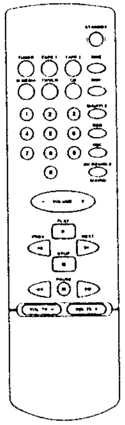


Positioning of the speakers

- You will find the best speaker position by experimenting.
  Placing the speakers on the floor will increase the bass response.
  Placing the speakers behind curtains, furniture etc. will reduce treble response and the stereo effect.
  You will obtain the ideal position when the two front speakers and the listening position build an equilateral triangle and the speakers are at ear-height.

Remote control functions

- Always first select the desired sound source and then press the required function key (for example CD + PLAY ▶ or TAPE + PLAY ▶.



Notes:
- The remote control remains tuned to the selected sound source until another sound source button on the remote control is pressed.

- The corresponding LED indicator above the sound source buttons on the system flashes when its source is operated by the remote control.

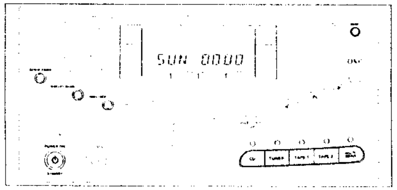
- You can only control TV/VCR if this unit uses the RC-5 remote control system.

- Pressing TV/VCR will first switch on the TV set and after 1 sec the whole audio set.
If TV/VCR is selected, the STANDBY button will first switch the TV set to standby and after 1 sec. the whole set.

- Pressing TV/VCR for more than 1 sec will select the external source that is connected via the LINE IN sockets.

STANDBY	to switch the system to the standby mode
TUNER - TAPE 1 - TAPE 2 - M.MEDIA - TV/VCR - CD	sound source selection buttons
SIDE	***TAPE 1 or 2:*** to select the front or back side of the tape (FRONT/BACK)
DISC	***CD:*** to select a CD (1-7) - *not applicable to all versions*
SHUFFLE	***CD:*** to switch on/off the shuffle feature
DBB	to increase the bass level
DSC	to select the desired sound setting: ROCK→CLASSIC→JAZZ→OPTIMAL→ USER 1→USER 2→ROCK→...
INCREDIBLE SOUND	to switch on/off this sound feature
Digits 0-9	(numbers consisting of two figures must be keyed in within 2 seconds) ***CD:*** to key in a track number ***TUNER:*** to key in a preset number ***TV:*** to key in a TV station
VOLUME – +	to adjust the volume level of the audio system
PLAY ▶	***CD, TAPE 1 or 2, VCR:*** to start playback
⏮ PREV./NEXT ⏭	***TUNER:*** to select a radio preset station ***CD:*** to select the beginning of the current/ previous or a subsequent track ***TV:*** to select a TV preset station
STOP ■	***CD, TAPE 1 or 2, VCR:*** to stop playback
◀◀ ▶▶	***TUNER:*** to tune to a radio station ***CD:*** to search a particular passage ***TAPE 1 or 2, VCR:*** to wind the tape
PAUSE II	***CD, TAPE 1 or 2, VCR:*** to interrupt playback
VOL TV – +	***TV:*** to adjust the volume

Switching on and off/standby



- ***To switch on the unit***, press POWER ON/STANDBY on the unit or any sound source button on the unit or on the remote control.
  –► The display illumination comes up with full intensity. The selected sound source is indicated on the display and the belonging LED indicator above the sound source button lights up.

- ***To switch off the unit***, press POWER ON/STANDBY on the unit or on the remote control.
  –► The system is in standby mode. The display illumination is half dimmed and the display shows the day and time.

- ***To switch off the power supply***, remove the mains plug from the wall socket.

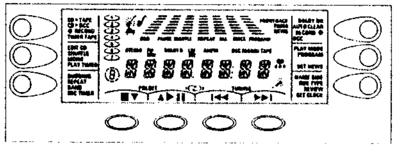
Notes:
- You can also switch on the set by pressing DISPLAY MODE, ANALYZER, CLOCK·TIMER or DEMO.
- The clock memory will be maintained for only ten minutes after the power supply is switched off.

Adjusting the display illumination

- You can change the intensity of the display illumination by pressing BRIGHTNESS.
  –► When the system is switched on, the illumination switches from FULL INTENSITY→HALF INTENSITY→OFF→FULL ...
  –► In standby mode, the illumination switches from HALF INTENSITY→OFF→HALF ... When the display is off, the power consumption is reduced to about 1 Watt.

Note: When switching on the system, the display always comes on with full intensity.

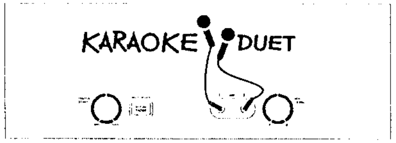
System display and buttons



When you select a sound source or the clock/timer mode, the functions available for the chosen source or the clock/timer mode light up in the display. Using the 10 buttons around the display field, you can select the desired function. These functions are explained in the appropriate chapters in detail.

KARAOKE – microphone mixing

Using a microphone you can mix your voice with any sound source:



1 To prevent acoustic feedback e.g. a loud howling sound, set the control MIC LEVEL to the minimum before you plug in the microphone.
2 Connect either 1 or 2 suitable microphones to the MIC sockets.
3 Select the desired sound source CD, TUNER, TAPE 1, TAPE 2 or MULTIMEDIA and start its playback.

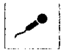
- You can mix a digital echo with the signal of the microphones. Use the control DIGITAL ECHO to adjust the echo level for the desired effect. DIGITAL ECHO does not function in TUNER mode.

- Adjust the mixing ratio with the MIC LEVEL control.

- You can fade out the vocal on a ***CD or a tape*** in 4 different ways: Press VOCAL FADER several times until the desired option is displayed:

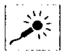
  - **VOCAL FADER:** reduces/fades out the vocal of the original song.

  - **AUTO VOCAL FADER:** reduces/fades out the vocal of the original song only for the time you use the microphone. The vocal is faded in again as soon as you stop singing. When (AUTO) VOCAL FADER is activated, this symbol (flashes) lights up in the display.



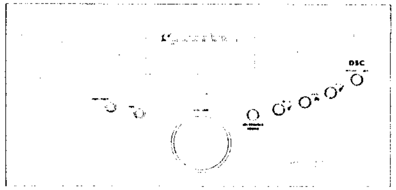
  - **MULTIPLEX** (*for special KARAOKE CDs only!*): suppresses the right channel (= vocal) of the KARAOKE CD. The music is audible on both channels.

  - **AUTO MULTIPLEX** (*for special KARAOKE CDs only!*): suppresses the right channel (= vocal) only for the time you use the microphone. The music is audible on both channels. The vocal is faded in again as soon as you stop singing. When (AUTO) MULTIPLEX is activated, this symbol (flashes) lights up in the display.



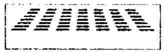
  - **OFF:** The VOCAL FADER feature is switched off.

Notes:
- It is also possible to record the mixed signal. However, mixing is not possible in DUBBING mode (copying one tape to another).
- If you don't want to record via the microphone, unplug the microphone to avoid accidental mixing with the recording source.
- Due to the recording technique of some CDs it is unfortunately possible that the feature (AUTO) VOCAL FADER does not work
- We do not recommend to use MULTIPLEX or AUTO MULTIPLEX with a conventional AUDIO CD. The music information would not be transmitted completely and you would only receive mono sound.



ANALYZER – Spectrum Analyzer

The graph bars in the centre of the display show the sound levels. The spectrum analyzer shows continuously the frequency distribution of the current sound.



- By pressing the ANALYZER button, the spectrum analyzer bars are either hidden or shown.
  –► The display shows either ANALYZER OFF or ANALYZER ON.

Note: When switching on the system, the spectrum analyzer is always switched on.

DBB – Dynamic Bass Boost

- The bass response can be enhanced in 3 steps: every time you press the DBB button, the bass is enhanced even stronger or the DBB feature is switched off.
  –► The display shows the selected DBB level:
  DBB 1→DBB 2→DBB 3→DBB OFF→DBB 1→...

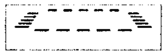
ROCK / CLASSIC / JAZZ

- Press ROCK, CLASSIC or JAZZ (or DSC on the remote control) to enhance the type of music you are listening to.
  –► In the display the corresponding icon lights up.
  A realistic atmosphere for the selected style of music is created.

INCREDIBLE SOUND

- Additionally to all other sound settings, you can activate the incredible sound feature by pressing INCREDIBLE SOUND.
  ► This creates a phenomenal surround sound effect even if the speakers are positioned close to the system.
  The sound becomes "incredibly" spatial.

  The button lights up when the incredible sound feature is switched on.



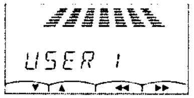
Switchable "OPTIMAL·USER" sound presets

- By repeatedly pressing OPTIMAL·USER, the display shows the different equalizer settings:
  OPTIMAL→USER 1→USER 2→OPTIMAL→...

OPTIMAL: This equalizer setting is specially tuned to the acoustics of the supplied LSB 650 speakers.
USER 1 / USER 2: Here you have the possibility to set your individual sound or to listen to your own equalizer setting.

USER 1 / USER 2
Setting the equalizer

1 Press OPTIMAL·USER several times until the display shows USER 1 or USER 2.
  –► The display function buttons light up and flash for 7 sec.



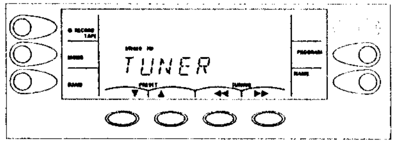
2 Use the display buttons ▼ ▲ and ◄◄ ►► to adjust
  -bass (left two bars),
  -middle tones (middle three bars) and
  -treble (right two bars).
  –► The graph bars change according to your settings.
  –► If no button is pressed for 90 seconds, the sound setting mode is left automatically and the last changes are stored in the memory.

3 You can also leave the sound setting mode by pressing OPTIMAL·USER again.
  –► The new sound setting is stored.

Note: From the moment the buttons ▼ ▲ and ◄◄ ►► light up, you have got 7 sec to start adjusting the sound. If non of these buttons are pressed within 7 sec, the sound setting mode is left again.

Tuning to radio stations

1 Press TUNER on the unit or on the remote control.
-► First TUNER appears on the display and after a few seconds it will show the current frequency or the station name if available. The available display button functions light up:



2 Select the desired waveband by repeatedly pressing BAND.

3 Hold down TUNING ◄◄ or ►► (◄◄ or ►► on the remote control) until you approach the required frequency.
-► As long as the button is pressed, the digits on the display change according to the frequency.
-► As soon as you release the button, SEARCH appears on the display and the tuner searches the next station of sufficient strength. If the frequency has already been stored, the preset number is also displayed.

4 Press MONO to switch over to mono reception if there is interference noise caused by poor FM stereo reception.
-► Briefly MONO is displayed and the icon STEREO disappears.
-► When you switch back to stereo reception, the display will briefly show STEREO.

5 Repeat this procedure until you find the desired station.

Note: If you briefly press TUNING ◄◄ or ►► (◄◄ or ►► on the remote control), the frequency changes step by step.

Programming radio stations (preset stations)

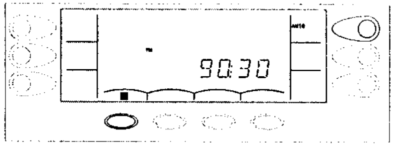
Automatic programming
30 radio stations can be stored automatically in the memory. This function will clear the old preset numbers. If less than 30 radio stations are found, the remaining preset numbers will not be changed.

1 Press TUNER on the unit or on the remote control.

2 Press PROGRAM to enter the programming mode.

3 Select the waveband by repeatedly pressing BAND.

4 Press AUTO to start the automatic programming.
-► The available display button functions light up and AUTO starts flashing:



► The tuner automatically tunes to stations in the selected waveband. If less than 30 stations of sufficient strength are found, the tuner will stop.
-► The last newly stored preset number is automatically tuned in.

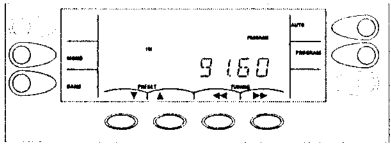
- To stop the automatic programming, press AUTO or ■.

Note: If you want to maintain some old presets, for example preset 1-9, select preset 10 ***before starting automatic programming:*** *now only the presets 10 up to 30 will be programmed.*

Manual programming
You can store up till 30 radio stations in the memory.

1 Press TUNER on the unit or on the remote control.

2 Press PROGRAM to enter the programming mode.
-► The available display button functions light up and PROGRAM starts flashing:



3 Select the waveband by repeatedly pressing BAND.

4 Tune to the station to be programmed with TUNING ◄◄ or ►► (or ◄◄ or ►► on the remote control), as described earlier.

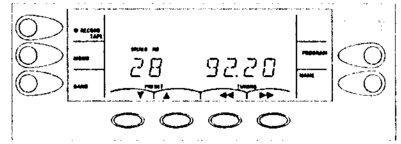
5 If desired, switch over to FM mono reception by pressing MONO.

6 Press PRESET ▲ or ▼ to allocate a number from 1 to 30 to the preset station (on the remote control use the buttons I◄ or ►I or 0-9).

7 Press PROGRAM to confirm the setting.
-► The frequency, preset number and stereo setting are now entered in the memory.

Note: When you store a new frequency, the radio station name belonging to the old frequency is also cleared.

Selecting a preset station



- Press PRESET ▲ or ▼ until the desired preset number appears on the display (on the remote control use the buttons I◄ or ►I or 0-9).

RECORD TAPE ●

1 As soon as you press RECORD TAPE ●, the current sound will be recorded on TAPE 2, provided a tape suitable for recording is loaded.

2 To stop recording, press ■ (or STOP ■ on the remote control).

Switchable tuning grid *(not on all versions)*

In North and South America the frequency step between adjacent channels in the AM band is 10 kHz. In the rest of the world this step is 9 kHz. Usually the frequency step has been preset in the factory for your area.

In some versions the frequency step can be changed.

- Select AM by repeatedly pressing BAND.

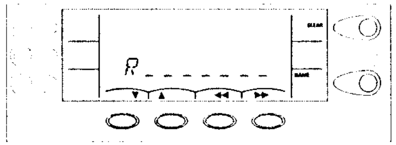
- Keep the sound source button TUNER pressed for more than **5 sec.**
-► The display shows either GRID 10 or GRID 9.

Programming a radio station name

You can assign a name of 8 characters to the preset stations.

1 First select the preset station by pressing PRESET ▲ or ▼ (on the remote control use the buttons I◄ or ►I or 0-9).

2 Press NAME to enter the name programming mode.
► The available display button functions light up and NAME starts flashing A cursor flashes at the leftmost position.



► If a name is already assigned to the chosen preset station, this name will then be displayed.

3 Move the cursor to the left or right by pressing ◄◄ or ►► (◄◄ or ►► on the remote control).

4 Select the desired character (A-Z, 0-9) by pressing ▲ or ▼ (on the remote control use the buttons I◄ or ►I).

5 If your station name is correct, press NAME to store the name in the memory.

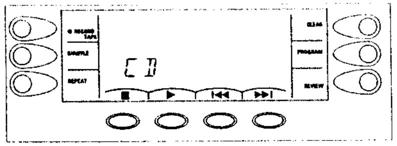
- You can erase a station name by pressing CLEAR.

- The display normally shows the radio station name if available. By repeatedly pressing DISPLAY MODE you can change the type of display information:
► The display shows in turn: STATION NAME -FREQUENCY -STATION NAME...

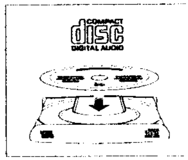
Note: If the name programming mode is selected for more than 90 seconds without pressing ▲ ▼ or ◄◄ ►►, the last name will be recalled and the name programming mode will be left without storing any changes.

Playing a CD

1 Press CD on the unit or on the remote control.
 -► Briefly CD appears on the display. If there is no CD in the selected CD tray, the display will then show NO DISC.
 The available display button functions light up:

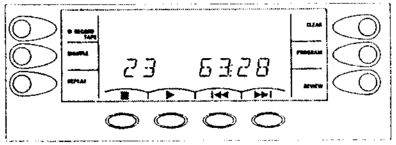


2 Press OPEN·CLOSE on the unit to open the CD tray.
 -► The display shows OPEN.



3 Insert a CD, printed side up. Use only Digital Audio CDs.
 8 cm CDs can be played as well.

4 Close the tray by pressing OPEN·CLOSE.
 -► The display shows READING and then the total number of tracks and the total playing time.



5 Press ▶ (or PLAY ▶ on the remote control) to start playback of the entire CD.
 -► Playback starts with the first track.
 The display shows the current track number and its elapsed playing time.
 -► When all tracks have been played, the CD player stops.
 The total number of tracks and the total playing time appear on the display.

6 To stop CD play, press ■ (or STOP ■ on the remote control).

- You can interrupt CD play by pressing ❚❚ (or PAUSE ❚❚ on the remote control).
 Continue CD play by pressing ▶ (or PLAY ▶ on the remote control).

Notes:
- You can also start CD play by selecting a track with the buttons 0-9 on the remote control.
- The tray will also close if you press ▶ or SHUFFLE or gently push against the CD tray.
- CD play also stops if you press OPEN·CLOSE or select another sound source.
- The system will switch off automatically, if no button is pressed for more than 15 minutes after CD play has finished.

Changing the display time indication

- During play, the display normally shows the elapsed playing time of the track currently played. You can change the type of the time information, by repeatedly pressing DISPLAY MODE on the unit.
 -► The display shows in turn: REMAINING TIME OF CURRENT TRACK → REMAINING TIME OF CD → ELAPSED TIME OF CURRENT TRACK → ...

Selecting another track

- Briefly press ◀◀ or ▶▶ once/several times to skip to the beginning of the current/previous or subsequent track (on the remote control use the buttons ◀ or ▶ or 0-9).
 -► The display shows the selected track number.
 -► During play: CD play continues automatically with the selected track.
 -► In the stop position: press ▶ to start CD play.

Searching for a passage during CD play

1 Hold down ◀◀ or ▶▶ (or ◀◀ or ▶▶ on the remote control) to find a particular passage in the forward or backward direction.
 -► The volume is automatically reduced to a low level.

2 Release the button when you have reached the desired passage.

Note: In the shuffle mode and when playing a program, searching is only possible within the playing track.

Selecting another source during CD play

- You can select another sound source during CD play. If you select the CD source again, the CD player will return to the original mode: PLAY, SHUFFLE, REPEAT or PROGRAM.
 -► CD play will resume at the position where it was interrupted.

Note: CD play cannot be resumed if the unit has been switched to standby in the meantime.

RECORD TAPE ●

1 As soon as you press RECORD TAPE ●, the current CD-sound will be recorded on TAPE 2, provided a tape suitable for recording is loaded.

2 To stop recording and CD play, press ■ (or STOP ■ on the remote control). If you only want to stop recording, press TAPE 2 first, and then press ■.

REPEAT – repeating a track or the entire CD

1 Press REPEAT on the unit several times until the desired option is displayed:

REPEAT: The current track is played repeatedly.
REPEAT ALL: The entire CD (or program) is played repeatedly.

 -► During play: The selected repeating mode is automatically executed.
 -► In the stop position: press ▶ to start CD play.

2 To return to normal CD play, press REPEAT until all related indications (REPEAT ALL) disappear from the display.

SHUFFLE – playing in random order

1 Press SHUFFLE on the unit or on the remote control before or during playback.
 -► The display shows **SHUFFLE**; all the tracks will now be played in a random order.

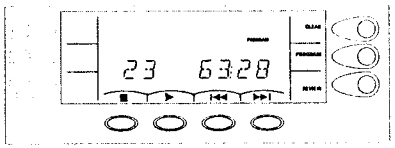
2 To return to normal CD play, press SHUFFLE on the unit (or on the remote control).

Note: You can combine some of the REPEAT and SHUFFLE features at the same time and for example repeatedly play the entire CD or program in random order (SHUFFLE REPEAT ALL).

Programming track numbers

You may select a number of tracks and store these in the memory in the desired sequence. You may store any track more than once. At most, 20 tracks can be stored in the memory. The display will show the message PROGRAM FULL, if you exceed the maximum of 20 tracks.

1 Press PROGRAM to enter the CD programming mode.
 -► The available display button functions light up and PROGRAM starts flashing:



2 Select the desired track by pressing with ◀◀ or ▶▶ (or ◀ or ▶ or 0-9 on the remote control).

3 As soon as the desired track is displayed, press PROGRAM to store the track.
 -► The display shows the total number of stored tracks, followed by the just stored track number. PROG behind the track number indicates, this track number is stored.

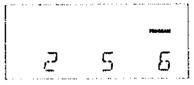
4 Select and store in this way all desired tracks.

5 Quit the CD programming mode by pressing ■ (or STOP ■ on the remote control) or immediately start playback of the program by pressing ▶ or SHUFFLE (or PLAY ▶ or SHUFFLE on the remote control).

Note:
You can also program a sequence of tracks while playing a CD.

Reviewing your settings

- You can review your settings by pressing REVIEW.
 -► The display shows in bundles of three all stored track numbers. During CD play only the tracks that still have to be played are shown on the display.



Note: If you press REVIEW when no program is available, the message NO PROGRAM will appear on the display.

Clearing the entire program (in the stop position)

- Press CLEAR to clear the program.
 -► On the display PROGRAM CLEARED briefly lights up and the flag PROGRAM disappears.

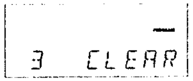
Note: The program will also be cleared if you interrupt the power supply or open the CD tray.

Clearing a track from a program

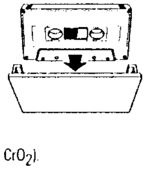
1 Press PROGRAM to enter the CD programming mode.

2 Select the track to be cleared by pressing ◀◀ or ▶▶ (◀◀ or ▶▶ on the remote control).

3 As soon as the number you wish to clear is displayed, press CLEAR.
 -► The cleared track number and CLEAR appear briefly.



Inserting a tape

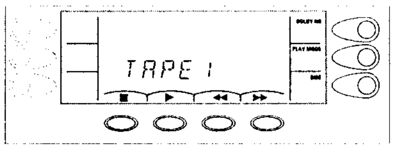


1 Press OPEN to open the cassette compartment.

2 Insert the tape with the open side down.
- ► The display shows 000.
- ► The deck detects the presence of a tape in the cassette compartment and automatically selects the tape type (NORMAL or CrO_2).

Playing a tape

1 Press TAPE 1 or TAPE 2 on the unit or on the remote control.
- ► Briefly TAPE 1 or TAPE 2 appears on the display. The available display button functions light up:

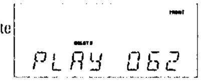


2 Insert a recorded tape with the open side down.

3 Select the tape side by pressing SIDE on the unit (or on the remote control) several times until the desired indicator lights up:
- ► FRONT: the visible side will be played.
  BACK: the invisible backside will be played.
- ► The tape counter is set to 000.

4 If desired, switch on the Dolby NR system by pressing DOLBY NR.

5 Press ► (or PLAY ► on the remote control) to start playback.
- ► The display shows the tape counter.



6 Press ■ (or STOP ■ on the remote control) if you want to stop playback before the end of the tape

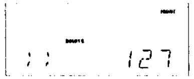
Notes:
- You can set the tape counter to 000 by pressing SIDE twice.

- If no button is pressed for more than 15 minutes after playback has finished, the system automatically switches off.

Fast winding

During playback

1 Hold down ◄◄ or ►► (or ◄◄ or ►► on the remote control) to find a particular passage in the forward or backward direction.
- ► The volume is automatically reduced to a low level.



2 Release the button when you have reached the desired passage.

In the stop position

1 Briefly press ◄◄ or ►► (or ◄◄ or ►► on the remote control).

2 Stop winding by pressing ■ (or STOP ■ on the remote control).

Play mode

- You can select the playback mode by pressing PLAY MODE several times until the desired indicator lights up:

⊐	to play (record) one side. At the end of the first side the recorder stops.
⊃	to play (record) both sides once. At the end of the first side, the tape direction is reversed and the recorder stops at the end of the second side.
⊂⊃	for non-stop playback. The deck reverses the tape direction (up to ten times) whenever reaching the end of the tape side. To stop, press ■.
1⊂⊃2	for non-stop playback on both decks. The deck reverses the tape direction (up to ten times on each deck) when reaching the end of the tape side. Playback of both tape sides rotates between deck 1 and deck 2. To stop, press ■.

Note: For a recording only the play modes ⊐ and ⊃ are available.

Dolby B Noise Reduction System

The Dolby B NR System is manufactured under license from Dolby Laboratories Licensing Corporation. The word Dolby and the DD symbol are trademarks of Dolby Laboratories Licensing Corporation.

- Switch the Dolby B NR on and off with the DOLBY NR button.

Notes:
- A tape recorded with the Dolby B NR system should also be played in the Dolby B NR mode. If you forget to operate the DOLBY NR button, the treble may be reproduced too strongly or too faintly.

- Dolby NR button has no influence during dubbing (copying from TAPE 1 to TAPE 2). An original tape recorded with Dolby B NR automatically produces a copy with Dolby B NR.

General information on recording

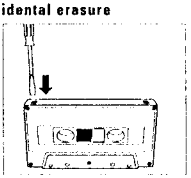
– Recording is permissible insofar as copyright or other rights of third parties are not infringed.

– At the very beginning and end of the tape, no recording will take place during the 7 seconds when the leader tape passes the recorder heads.

– When a recording is active, most functions are disabled. RECORDING ACTIVE will appear on the display when a wrong button is pressed.

– In general, the recording level is set automatically. The recording is not affected by the controls VOLUME, DBB, INCREDIBLE SOUND, ROCK, CLASSIC, JAZZ and OPTIMAL USER.

Protecting tapes against accidental erasure

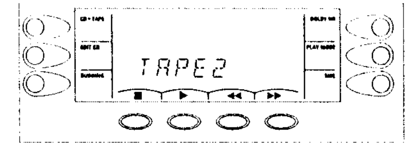


- Keep the tape side to be safeguarded in front of you and break out the left tab. Now, recording on this side is no longer possible.
- To render this safeguard ineffective, cover the aperture with a piece of adhesive tape.

Recording from a CD

1 Insert a CD and, if desired, program track numbers.

2 Press TAPE 2 on the unit or on the remote control.
- ► The available display button functions light up.



3 Insert a blank tape into TAPE 2.

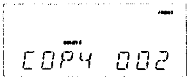
4 Select the tape side by pressing SIDE: FRONT or BACK.

5 Select the play mode by pressing PLAY MODE until the desired indicator lights up: ⊐ or ⊃.

6 If desired, switch on the Dolby NR system by pressing DOLBY NR.

7 If you want to make a "EDIT CD recording", follow from here the instructions for EDIT CD.

8 Start the recording by pressing CD ►TAPE.
- ► The display shows COPY. With a delay of 7 sec (leader tape of the tape), playing of the CD or program starts automatically. At the end of the first side, recording stops somewhere within the running track.



- ► When ⊃ is selected, the tape direction is reversed and recording continues with the beginning of the incompletely recorded track.
- ► Recording will stop when it's finished according to the chosen play mode or when the CD player reaches the end of the CD or the program.

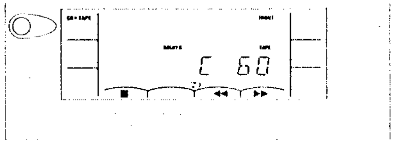
- Press ■ (or STOP ■ on the remote control) to stop the recording at an earlier stage.

EDIT CD – automatic CD track selection by specifying the tape length

To prevent that at the end of the tape the recording is interrupted somewhere within a track, you can use the EDIT CD feature. However, it can only be used for CDs with a maximum of 30 tracks.

The unit automatically selects the total number of tracks that will fit onto each tape side.
The original order of tracks will not be changed.

1 Press EDIT CD.
- ► SELECT TAPE LENGTH and C60 appear on the display



2 Press ◄◄ or ►► until the desired tape length appears on the display (on the remote control use the buttons |◄ or ►|.
- ► The display shows in turn:
  C60 → C90 → C100 → C120 → C30 → C45 → C60 → ...

3 Start the recording by pressing CD ►TAPE.
- ► With a delay of 7 sec (leader tape of the tape), playing of the CD or program starts automatically.
- ► Recording will stop when it's finished according to the chosen play mode or when the CD player reaches the end of the CD or the program.

- Press ■ (or STOP ■ on the remote control) to stop the recording at an earlier stage.

- You can change the type of the CD time information, by repeatedly pressing DISPLAY MODE on the unit:
- ► The display shows in turn: REMAINING TIME OF CURRENT TRACK • REMAINING TIME OF CURRENT TAPE SIDE • ELAPSED TIME OF CURRENT TRACK • ...

Dubbing tapes (copying from TAPE 1 to TAPE 2)

1 Insert a recorded tape into deck 1 and a blank tape into deck 2.

2 Press TAPE 1 and prepare the deck for the recording:
- Select the tape side by pressing SIDE: FRONT or BACK.
- Select the play mode by pressing PLAY MODE until the desired indicator lights up: ⊐ or ⊐.

3 Press TAPE 2 and select the tape side by pressing SIDE: FRONT or BACK.

4 Press DUBBING and thereafter select the dubbing speed by pressing ◄◄ or ►►.
→ The display shows NORMAL (normal speed) or FAST (high speed). During high-speed dubbing, the sound is reduced to a low volume.

5 Start recording by pressing DUBBING.
→ Both decks start running and either NORM DUB (normal speed dubbing) or FAST DUB (fast speed dubbing) appears.
→ Recording will stop when one or both sides of the tape are full (depending on the chosen play mode).

- Press ■ (or STOP ■ on the remote control) to stop the recording at an earlier stage.

Notes:
-PRESS STOP FIRST will light up if you press SIDE: you cannot reverse the playback direction during dubbing.

- During dubbing you can listen to any other sound source.

RECORD TAPE ●

1 As soon as you press RECORD TAPE ●, the current sound (CD, TUNER, TAPE 1 or MULTIMEDIA) will be recorded on TAPE 2.

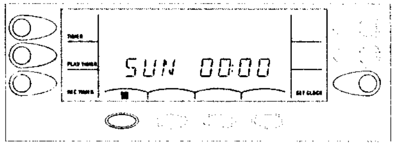
Erase an old tape by recording a silence:
Select CD without starting CD play and press RECORD TAPE ●.

2 To stop recording, press ■.

General

The display shows the weekday and the time. The clock display will flash and has to be set
- when you first plug the unit into the mains, or
- if the power supply was interrupted for longer than 10 minutes.

- Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display with its available display button functions appears:



- To leave the timer display, press ■, CLOCK-TIMER, POWER ON/STANDBY or any sound source selection button.

Notes:
- The clock and the timer cannot be set with the remote control.

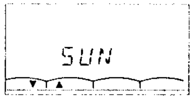
- If no button is pressed for more than 90 seconds, the clock setting mode is left automatically without storing the last changes.

Setting the clock

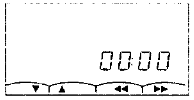
1 Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display as shown above appears.

2 Press SET CLOCK to enter the clock setting mode.
→ The function indicator SET CLOCK starts flashing.

3 Select the day by pressing ▲ or ▼ until the correct day is indicated.



4 Confirm the day by pressing SET CLOCK.
→ The hour and the minute digits appear.



5 Adjust the hours by using ▲▼ and the minutes by using ◄◄ ►►.
→ When pressing the buttons briefly, the digits will change step-by-step. By pressing longer, the running speed will increase after a few seconds.

6 Press SET CLOCK to store the setting and to leave the clock setting mode.
→ The clock starts running.

Setting the timer for a radio recording

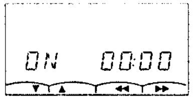
1 Insert a tape into TAPE 2.

2 Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display appears.

3 Press REC TIMER to enter the timer setting mode.
→ The function indicator REC TIMER starts flashing and a radio preset appears.

4 Press ▲ or ▼ until the desired preset station is indicated.

5 Confirm the preset station by pressing REC TIMER.
→ The message ON and the time appear.
The ***recording start time*** must be entered.



6 Adjust the hours and the minutes by using ▲▼ and ◄◄ ►►.

7 Confirm the start time by pressing REC TIMER.
→ The message OFF and the time appear.
The ***recording stop time*** must be entered.

8 Adjust the hours and the minutes by using ▲▼ and ◄◄ ►►.

9 Press REC TIMER to confirm the settings and to leave the timer setting mode.
→ The timer is activated and TIMER lights up on the display.

Setting the timer for playback

1 Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display appears.

2 Press PLAY TIMER to enter the timer setting mode.
→ The function indicator PLAY TIMER starts flashing and the last selected timer sound source appears.

3 Press ▲ or ▼ until the desired sound source is indicated.

4 Confirm your selection by pressing PLAY TIMER.
→ If you have selected TUNER, press ▲ or ▼ to select the desired preset station.
→ If you have selected CD, insert a CD.
→ If you have selected TAPE, insert a tape into the cassette compartment.

5 Confirm your selection by pressing PLAY TIMER.
→ The message ON and the time appear.
The ***start time*** must be entered.

6 Adjust the hours and the minutes by using ▲▼ and ◄◄ ►►.

7 Press PLAY TIMER to confirm the settings and to leave the timer setting mode.
→ The timer is activated and TIMER lights up on the display.

At the preset start time ...

→ The power is turned on or, if another sound source is selected, the set switches to the preset source.
The preset source comes on automatically.

→ 15 minutes after playback of the CD or the tape has finished, the system switches to standby.
If the timer is activated with the TUNER mode, the sound remains on until you switch off the system.

Notes:
- If the set was activated from standby mode and no button is pressed for more than 40 minutes, the power is turned off again.

- If there is the same start time for REC TIMER and PLAY TIMER, the REC TIMER will be activated.

- If you are recording at the time the timer is activated, the timer function will be cancelled.

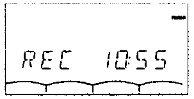
Reactivating/deactivating the timer

1 Press CLOCK-TIMER to enter the clock/timer mode.
→ The clock/timer display appears.

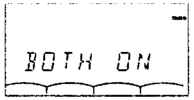
2 To switch off or to reactivate a timer function, press TIMER several times until the required indication appears:

→ PLAY (playback) and the programmed start time for activating the PLAY TIMER.

→ REC (recording) and the programmed start time for activating the REC TIMER.



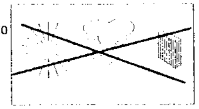
→ BOTH ON - both PLAY TIMER and REC TIMER are activated.



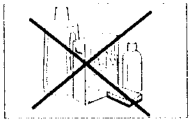
→ OFF for switching the timer off.

MAINTENANCE

General maintenance

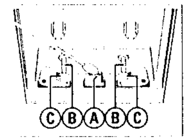


- Do not expose the set, CDs or tapes to humidity or rain, sand or to excessive heat caused by heating equipment or direct sunlight.
- The mechanical parts of the set contain self-lubricating bearings and must not be oiled or lubricated!



- You can clean the set with a soft, slightly dampened chamois leather. Do not use any cleaning agents as they may have a corrosive effect.

TAPE decks



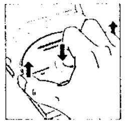
To ensure a good recording and playback quality, clean the head (A), the capstans (B) and the rubber pressure rollers (C) after approx. 50 hours of operation.

- Use a cotton bud slightly moistened with alcohol or a special head cleaning fluid.

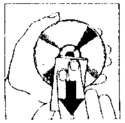
Note: Cleaning of the heads (A) can also be done by playing a cleaning tape through once.

CD player and CD handling

- The lens may cloud over when the set is suddenly moved from cold to warm surroundings. Playing a CD is then not possible. Leave the set in a warm environment until the moisture evaporates.



- To take the CD out of its box easily, press the centre spindle while lifting the CD.
- Always pick up the CD by the edge and put it back in its box after use.



- To clean the CD, wipe in a straight line from the centre towards the edge using a soft, lint-free cloth. A cleaning agent may damage the CD!
- Never write on a CD or attach any sticker to it.

TECHNICAL DATA

Technical data *(subject to modification)*

AMPLIFIER

Output power:	2x 45 W RMS/6 Ω/THD 10%
Power bandwidth:	40 - 20000 Hz
Frequency response:	40 - 20000 Hz
Signal-to-noise ratio:	≥ 67 dBA (IEC)
Impedance Loudspeakers:	≥ 6 Ω
Impedance headphones:	32 Ω - 1000 Ω (3 Vemk - 150 Ω)

TUNER

FM wave range:	87.5 - 108 MHz
MW wave range: Grid 9:	531 - 1602 kHz
Grid 10:	530 - 1700 kHz
Sensitivity at 75 Ω: mono, 26 dB signal-to-noise ratio:	2.8 µV
stereo, 46 dB, signal-to-noise ratio:	61.4 µV
Selectivity:	≥ 28 dB
Total harmonic distortion:	≤ 5%
Frequency response:	63 - 12500 Hz (± 3 dB)
Signal-to-noise ratio:	≥ 50 dBA

CD PLAYER

Frequency range:	20 - 20000 Hz
Signal-to-noise ratio:	90 dBA
Channel separation	60 dBA
Total harmonic distortion:	≥ 75 dB
Conversion:	Continuous Calibration 4x oversampling

TAPE DECKS

Frequency response: - CrO2 tape (type II):	60-14000 Hz (8 dB)
- Normal tape (type I):	60-14000 Hz (8 dB)
Signal-to-noise ratio (without Dolby NR):	
- CrO2 tape (type II)	
- Normal tape (type I):	47 dB
Signal-to-noise ratio (with Dolby NR):	
- CrO2 tape (type II)	
- Normal tape (type I):	55 dB
Wow and flutter:	≤ 0.4% DIN

SPEAKERS

System	3-way double bass reflex
Impedance	6 Ohms
Bass speaker	5 1/4 inch woofer
Mid/treble speaker:	2 1/2 inch tweeter
Upper treble	piezo tweeter
Dimensions (wxhxd):	210 x 310 x 251 mm

General

Dimensions (wxhxd):	240 x 310 x 335 mm
Weight (with/without speakers):	approx. 14/7 kg

TROUBLESHOOTING

- If a fault occurs, first check the points listed below before taking the set for repair.
- If you are unable to remedy a problem by following these hints, consult your dealer or service centre.

WARNING:

Under no circumstances should you try to repair the set yourself, as this will invalidate the guarantee.

PROBLEM	POSSIBLE CAUSE	REMEDY
No power	Mains lead is not securely connected.	Connect the mains lead properly.
No or poor sound	VOLUME is not turned up.	Turn up the VOLUME.
	Speakers are wrongly or not connected.	Check the speaker connections.
	Unsuited speakers are used.	Use recommended speakers.
	Badly matching equalizer setting for the given type of music	Choose a matching equalizer setting for the given type of music
	Headphones are connected	Disconnect the headphones.
Reversed left and right sound	Speakers are wrongly connected.	Connect the speaker cables correctly.
System does not react to operation of any button	Electrostatic discharge.	Disconnect the set from power supply and reconnect it after a few seconds.
Poor radio reception	FM antenna is not connected.	Connect the FM antenna.
	Interference caused by the vicinity of electrical equipment like TVs, video recorders, computers, etc.	Keep the set away from electrical equipment
The CD skips tracks	CD is damaged or dirty.	Replace or clean the CD.
Poor tape sound quality	Dust and dirt on the heads, capstan or pressure roller.	Clean the heads, capstan and pressure roller, see maintenance.
Remote control does not work	The distance to the system is too large.	Reduce the distance.
	Wrong sound source is selected.	Select the sound source before pressing the functional button.
	Batteries are incorrectly inserted.	Insert the batteries correctly.
	Batteries are exhausted.	Replace the batteries.

DISPLAY INDICATION	POSSIBLE CAUSE	REMEDY
NO DISC **or** CANNOT READ	CD is badly scratched or dirty.	Replace or clean the CD, see maintenance.
	No CD inserted.	Insert a CD.
	CD inserted upside down.	Insert a CD with label upwards.
	Laser lens is steamed up.	Wait until the lens has acclimatized.
WRONG TRACK	The selected track number does not exist on this CD or is not included in this program	Select a correct track number
NO TAPE	No tape inserted.	Insert a tape.
TAPE PROTECTED	Tape is protected against recording.	Replace the tape or undo the protection
RECORDING ACTIVE	A recording is active	Stop the recording or wait until it is finished.
EDIT NOT POSSIBLE	The EDIT CD feature can only be used for CDs with a maximum of 30 tracks	Use another CD with less than 30 tracks or create a program with less than 30 tracks

Warnings & Safety

ESD

(GB) WARNING

All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools at this potential.

(F) ATTENTION

Tous les IC et beaucoup d´autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévite pourrait être considérablement écourtée par le fait qu´aucune précaution nést prise à leur manipulation.
Lors de réparations, s´assurer de bien être relié au même potentiel que la masse de l´appareil et enfileer le bracelet serti d´une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l´on utilise soient également à ce potentiel.

(D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(NL) WAARSCHUWING

Alle IC´s en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen vermindern. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(I) AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

SAFETY

(GB)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.
Safety components are marked by the symbol ⚠

(D)

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

(I)

Le norme di sicurezza estigono che l´apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

(F)

Les normes de sécurité exigent que l´appareil soit remis à l´état d´origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.
Les composants de sécurité sont marqués ⚠

(NL)

Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkeliijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.
De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

(S) Varning !

Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(DK) Advarsel !

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

(FIN) Varoitus !

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle lasersäteilylle. Älä katso säteeseen !

(F)

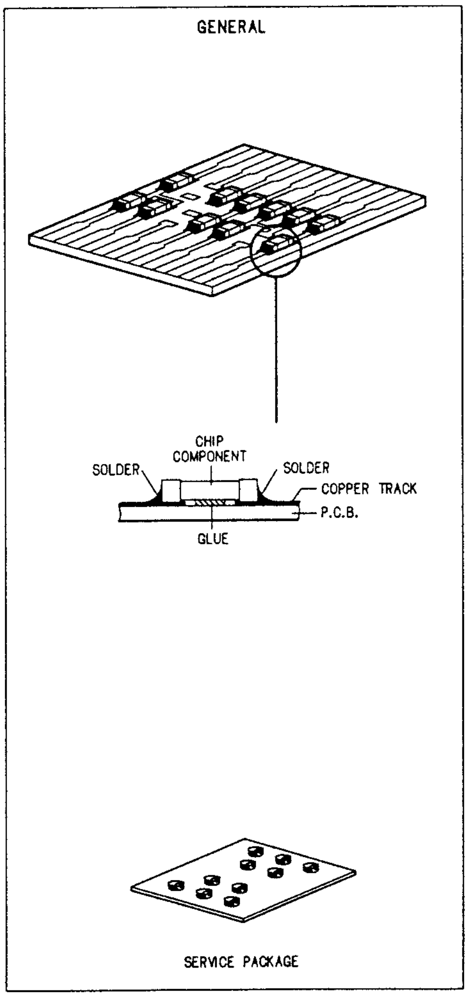
"Pour votre sécurite, ces documents doivent être utilisés par des spécialistes agrées, seuls habilités à réparer votre appareil en panne".

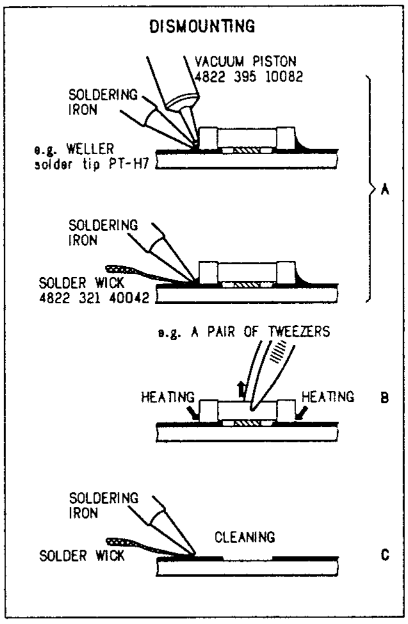
SERVICE HINTS

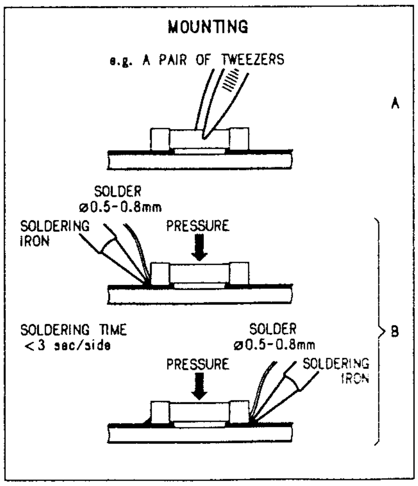
Service Tools

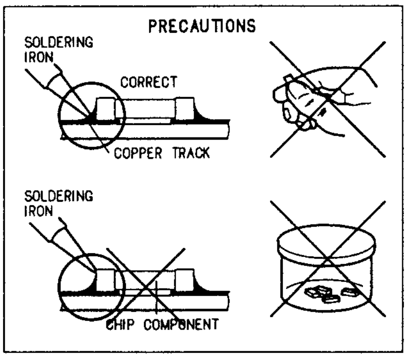
TORX screwdriver set SBC 163	4822 295 50145
Audio signal disc SBC 429	4822 397 30184
Test disc 5 (disc without errors) +	
Test disc 5A (disc with dropout errors, black spots and fingerprints) SBC 426/426A	4822 397 30096
Burn in test disc (65 min. 1kHz signal at -30dB level without "pause")	4822 397 30155
Universal test cassette Fe SBC 420	4822 397 30071
Universal test cassette CrO2 SBC 419	4822 397 30069

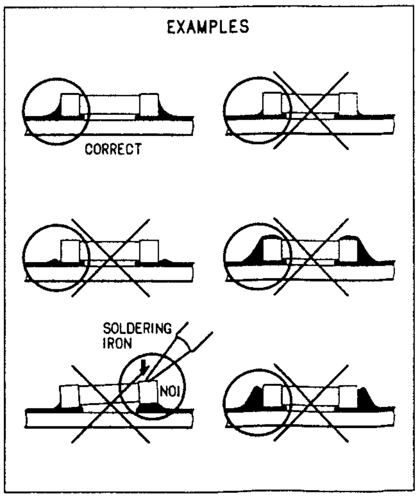
Handling Chip Components


GENERAL
CHIP COMPONENT
SOLDER
SOLDER
COPPER TRACK
P.C.B.
GLUE
SERVICE PACKAGE


DISMOUNTING
VACUUM PISTON 4822 395 10082
SOLDERING IRON
e.g. WELLER solder tip PT-H7
SOLDERING IRON
SOLDER WICK 4822 321 40042
A
e.g. A PAIR OF TWEEZERS
HEATING
HEATING
B
SOLDERING IRON
CLEANING
SOLDER WICK
C


MOUNTING
e.g. A PAIR OF TWEEZERS
A
SOLDER ø0.5-0.8mm
SOLDERING IRON
PRESSURE
SOLDERING TIME <3 sec/side
SOLDER ø0.5-0.8mm
PRESSURE
SOLDERING IRON
B


PRECAUTIONS
SOLDERING IRON
CORRECT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT


EXAMPLES
CORRECT
SOLDERING IRON
NOI

DISMANTLING INSTRUCTIONS

Dismantling of Cassette flap

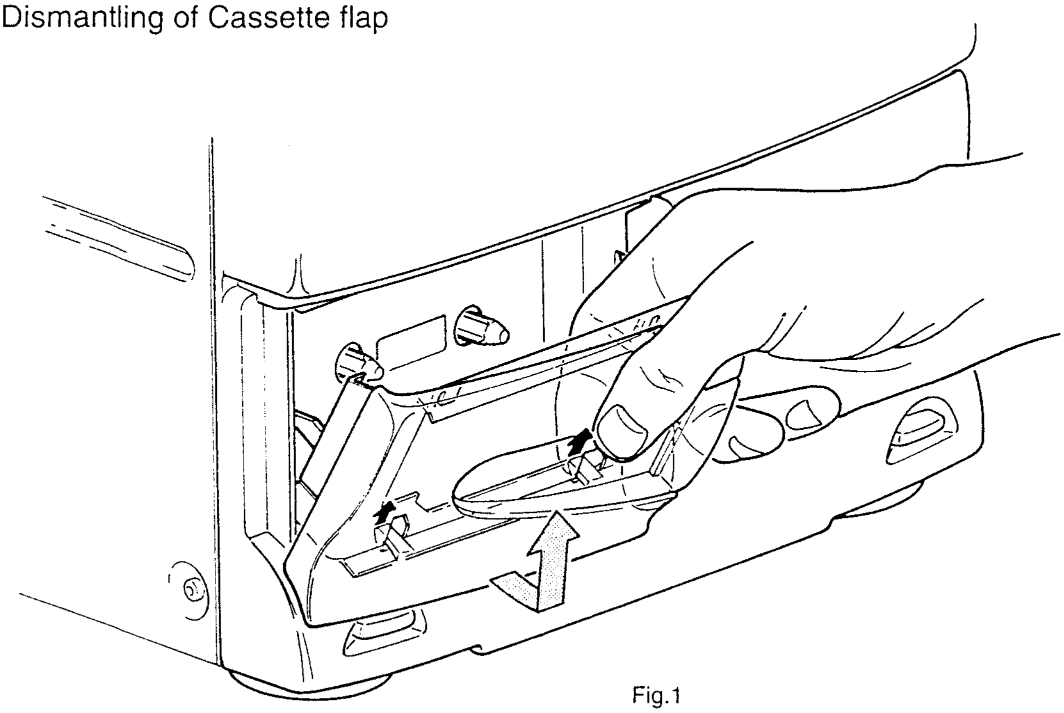


Fig.1

Dismantling the Karaoke Top (not on all Versions)

1) Release the two snaps on back sode
2) Lift the back side ov the cover first

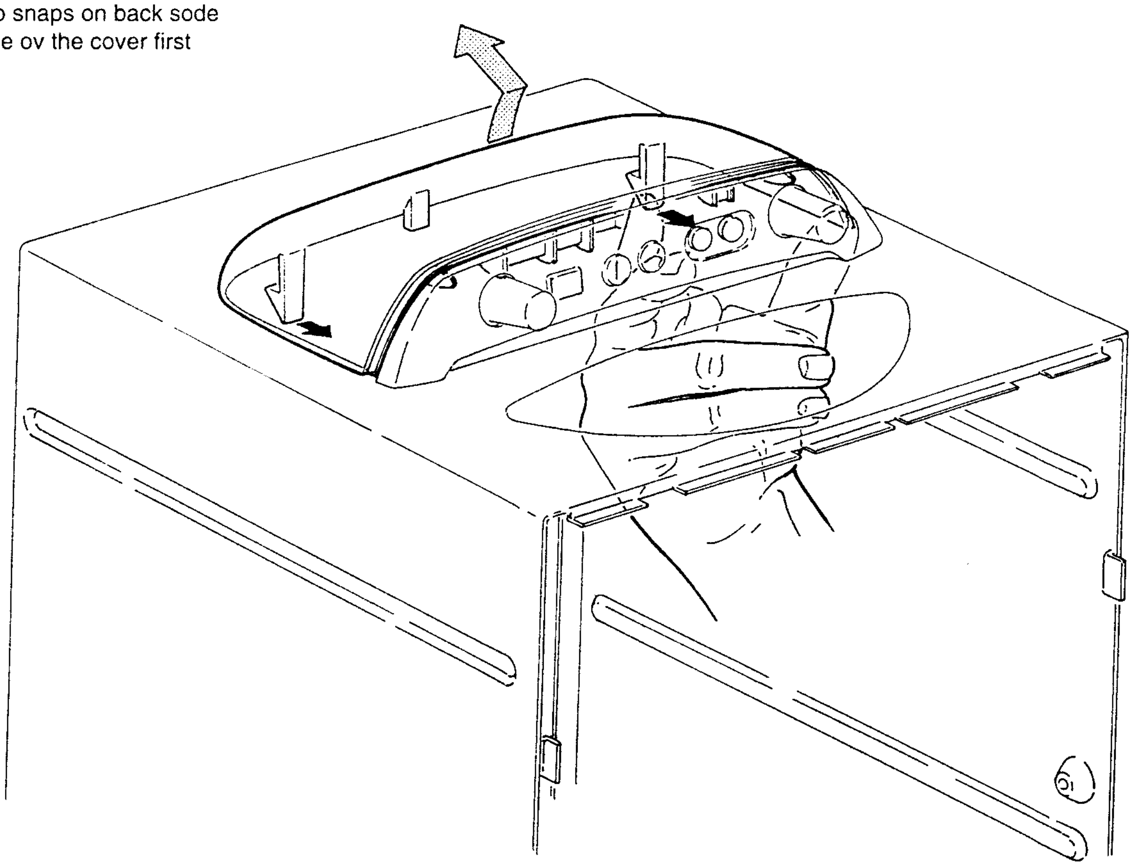
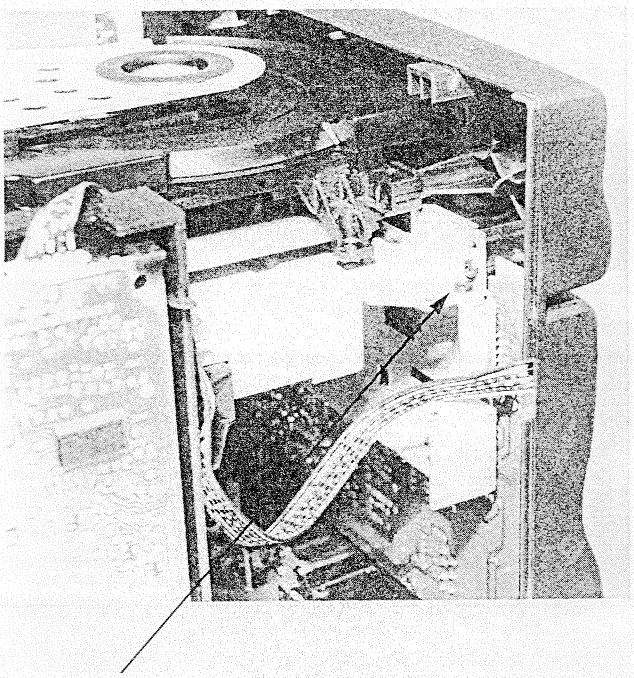


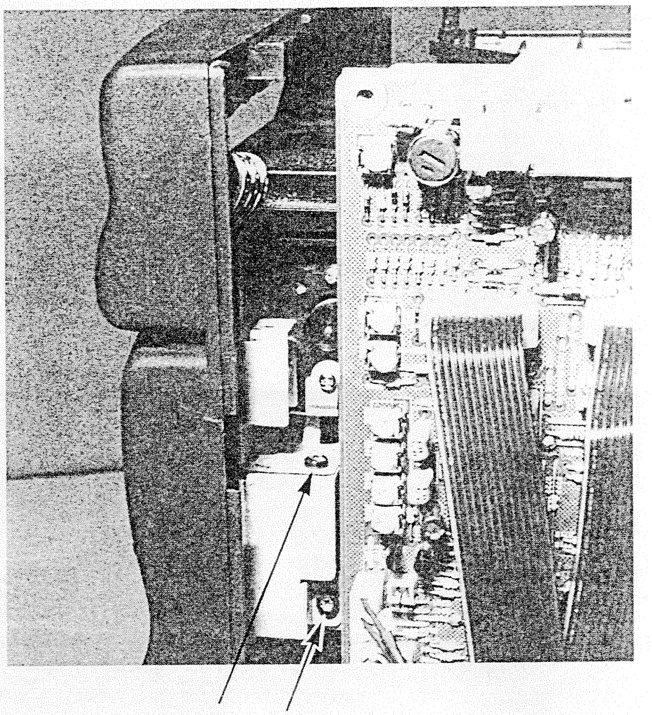
Fig.2

Dismantling of Front

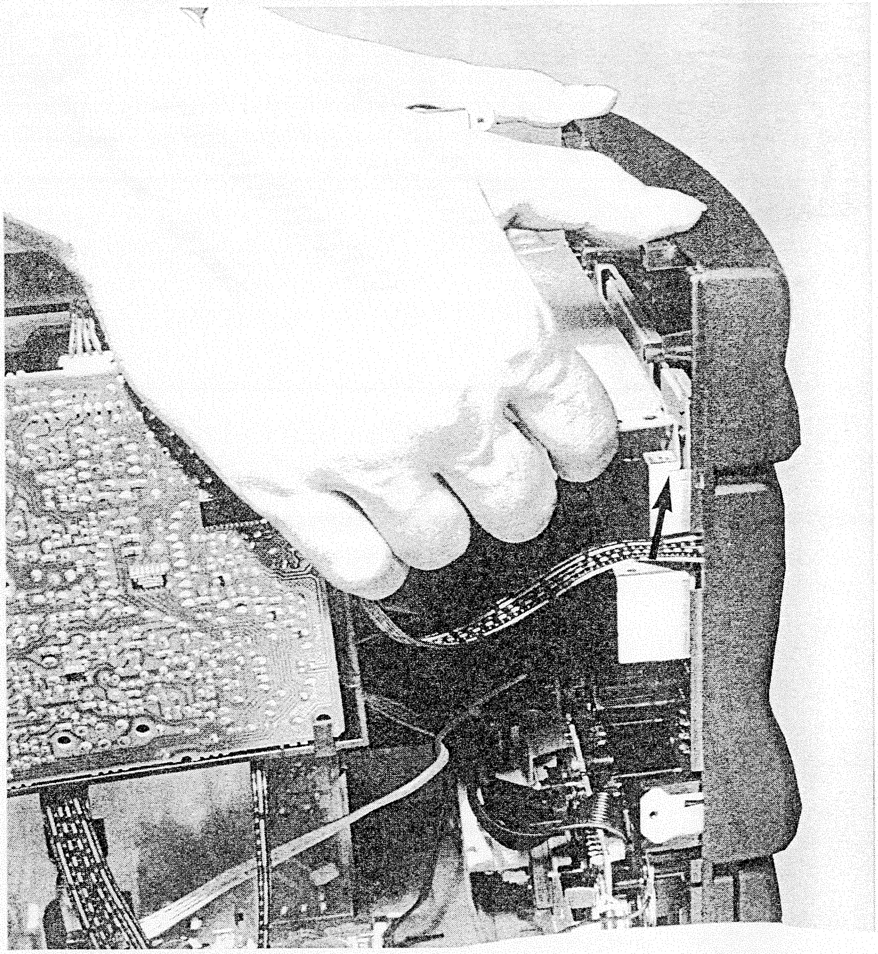
1) Remove top cover.
2) Loosen 3x screw on bottom.



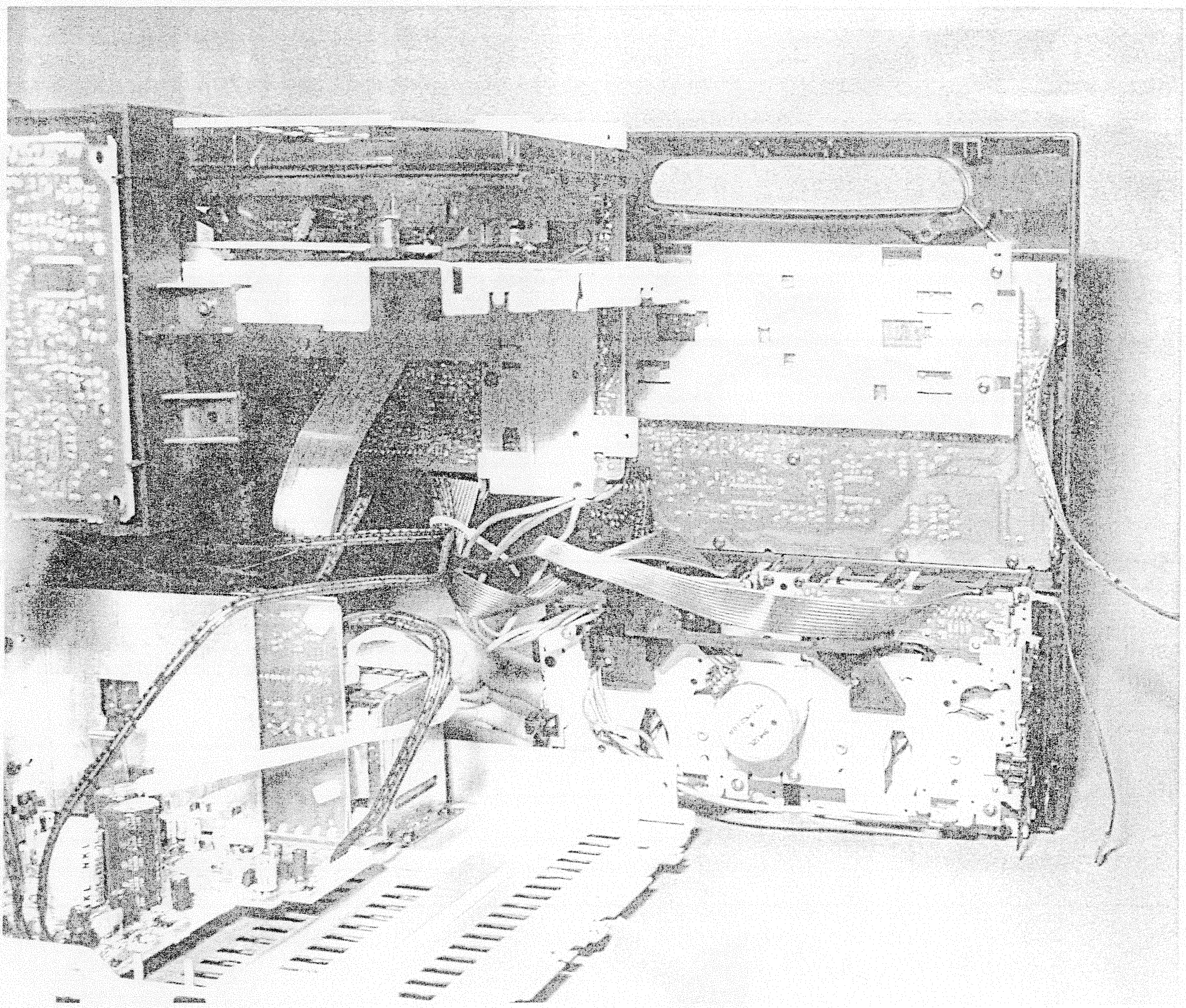
3) Loosen screw on metal bracket



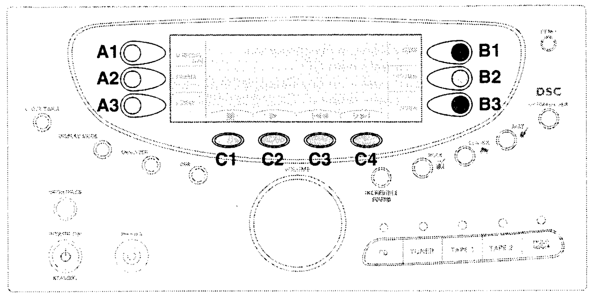
3) Loosen 2x screw on metal bracket
4) Lift the CD Module to release the metal bracket as shown in picture below.

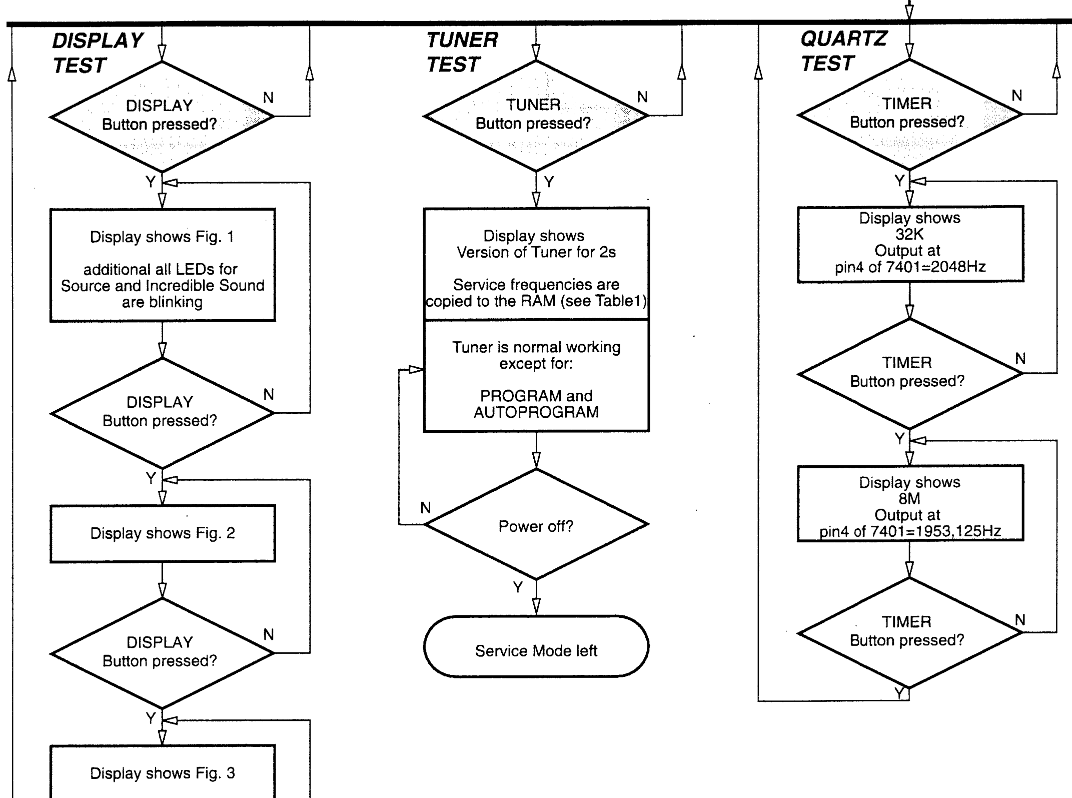


5) Turn the front sidewards as shown below.



SERVICE TEST PROGRAM

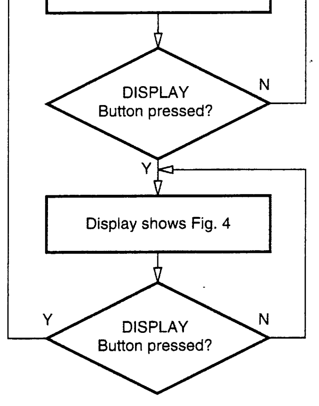

A1
A2
A3
B1
B2
B3
DSC
C1
C2
C3
C4

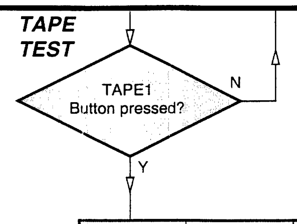

To start service test program hold B1 & B3 depressed while plugging in the mains cord
Display shows set version and number of ROM version "Sx yy zz" 1) (Main menu)
DISPLAY TEST
DISPLAY Button pressed?
N
Y
Display shows Fig. 1
additional all LEDs for Source and Incredible Sound are blinking
DISPLAY Button pressed?
Display shows Fig. 2
DISPLAY Button pressed?
Display shows Fig. 3
TUNER TEST
TUNER Button pressed?
Display shows Version of Tuner for 2s
Service frequencies are copied to the RAM (see Table1)
Tuner is normal working except for:
PROGRAM and AUTOPROGRAM
Power off?
Service Mode left
QUARTZ TEST
TIMER Button pressed?
Display shows 32K Output at pin4 of 7401=2048Hz
TIMER Button pressed?
Display shows 8M Output at pin4 of 7401=1953,125Hz
TIMER Button pressed?

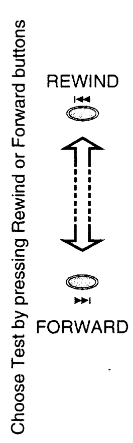
1) S stands for Service Testprogram
S1 stands for sets with CD
S2 stands for sets with CD Changer and RDS
S3 stands for sets with CD Changer without RDS

yy stands for software version number of µP on Front Board
(counted from 99 downwards)

zz stands for software version number of µP on Combi Board
(counted from 99 downwards)


DISPLAY Button pressed?
Y
N
Display shows Fig. 4
DISPLAY Button pressed?

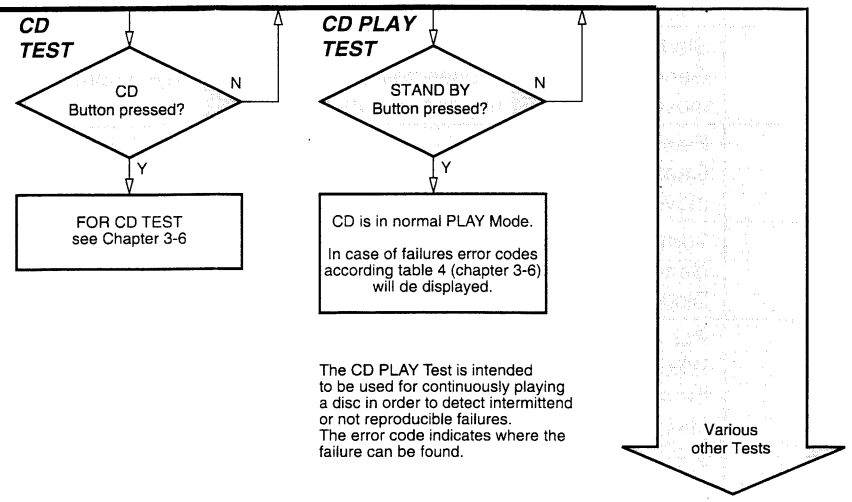

TAPE TEST
TAPE1 Button pressed?
N
Y


Choose Test by pressing Rewind or Forward buttons
REWIND
FORWARD

STEP	Display shows	ACTION
0	TAPE1	Select Tape1 as sound source
1	COIL	Solenoids of both decks activated for 3 seconds
2	PLAY	Normal Play mode for Deck1
3	FAST	Fast Play mode for Deck1 (High speed)
4	PLAY	Normal Play mode for Deck2
5	FAST	Fast Play mode for Deck2 (High speed)
6	REC	Record mode for Deck2
7	FAST	High speed dubbing
8		Leave Tape Test

PRESET	Europe "EUR"	East Europe "EAS"	USA "USA"	Oversea "OSE"	Korea "KOR"
1	108MHz	108MHz	108MHz	108MHz	180MHz
2	87,5MHz	65,81MHz	87,5MHz	87,5MHz	87,5MHz
3	1602kHz	1602kHz	1700kHz	1602kHz	1602kHz
4	531kHz	531kHz	530kHz	531kHz	531kHz
5	279kHz	279kHz	-	-	-
6	153kHz	153kHz	-	-	-
7	98MHz	98MHz	98MHz	98MHz	98MHz
8	558kHz	558kHz	560kHz	558kHz	558kHz
9	1494kHz	1494kHz	1500kHz	1494kHz	1500kHz

Table 1


CD TEST
CD Button pressed?
N
Y
FOR CD TEST see Chapter 3-6
CD PLAY TEST
STAND BY Button pressed?
CD is in normal PLAY Mode.
In case of failures error codes according table 4 (chapter 3-6) will de displayed.
Various other Tests

The CD PLAY Test is intended to be used for continuously playing a disc in order to detect intermittend or not reproducible failures.
The error code indicates where the failure can be found.

TEST	*Activated with*	*ACTION*
		Normal CD play but Errors according table 4 (Chapter 3-6) will be displayed
EEPROM TEST	CLASSIC	A testpattern will be sent to the EEPROM. Size of the eeprom (1K or 4K) is displayed if the pattern is read back correctly. Otherwise ERR will be displayed.
EEPROM CLEAR	JAZZ	Load default data. Display shows NEW for 1 second. ***Caution!*** ***All presets from the customer are lost!!***
KEY TEST	OPTIMAL USER	Key numbers according table 5 are shown on the display. (see Chapter 3-6)
TEMPERATURE TEST	ROCK	Temperature of the mains transformer is displayed for 2 seconds. At 115° Celsius the µP reduces the output power → DBB off, volume down. ***Values lower than 66°C are meaningless!***
LEAVE SERVICE TESTPROGRAM	disconnect mains	

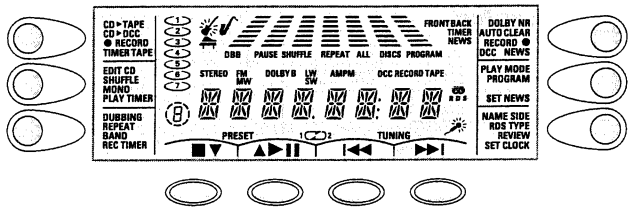

CD ▸ TAPE
CD ▸ DCC
● RECORD
TIMER TAPE
EDIT CD
SHUFFLE
MONO
PLAY TIMER
DUBBING
REPEAT
BAND
REC TIMER
DBB
PAUSE
SHUFFLE
REPEAT
ALL
DISCS
PROGRAM
FRONT BACK
TIMER
NEWS
STEREO
FM MW
DOLBY B
LW SW
AMPM
DCC RECORD TAPE
RDS
PRESET
TUNING
DOLBY NR
AUTO CLEAR
RECORD ●
DCC NEWS
PLAY MODE
PROGRAM
SET NEWS
NAME SIDE
RDS TYPE
REVIEW
SET CLOCK

Fig.1

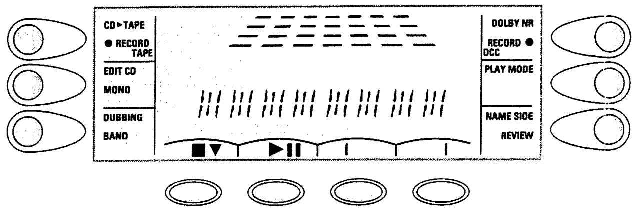

CD ▸ TAPE
● RECORD TAPE
EDIT CD
MONO
DUBBING
BAND
DOLBY NR
RECORD ●
DCC
PLAY MODE
NAME SIDE
REVIEW

Fig.2

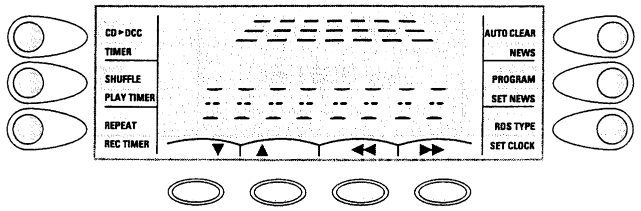

CD ▸ DCC
TIMER
SHUFFLE
PLAY TIMER
REPEAT
REC TIMER
AUTO CLEAR
NEWS
PROGRAM
SET NEWS
RDS TYPE
SET CLOCK

Fig.3

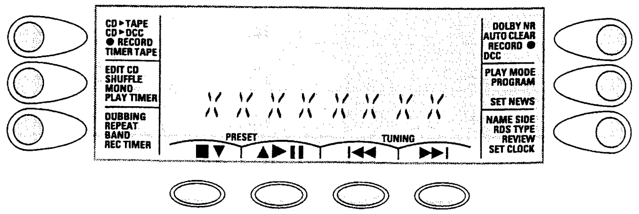

CD ▸ TAPE
CD ▸ DCC
● RECORD
TIMER TAPE
EDIT CD
SHUFFLE
MONO
PLAY TIMER
DUBBING
REPEAT
BAND
REC TIMER
PRESET
TUNING
DOLBY NR
AUTO CLEAR
RECORD ●
DCC
PLAY MODE
PROGRAM
SET NEWS
NAME SIDE
RDS TYPE
REVIEW
SET CLOCK

Fig.4

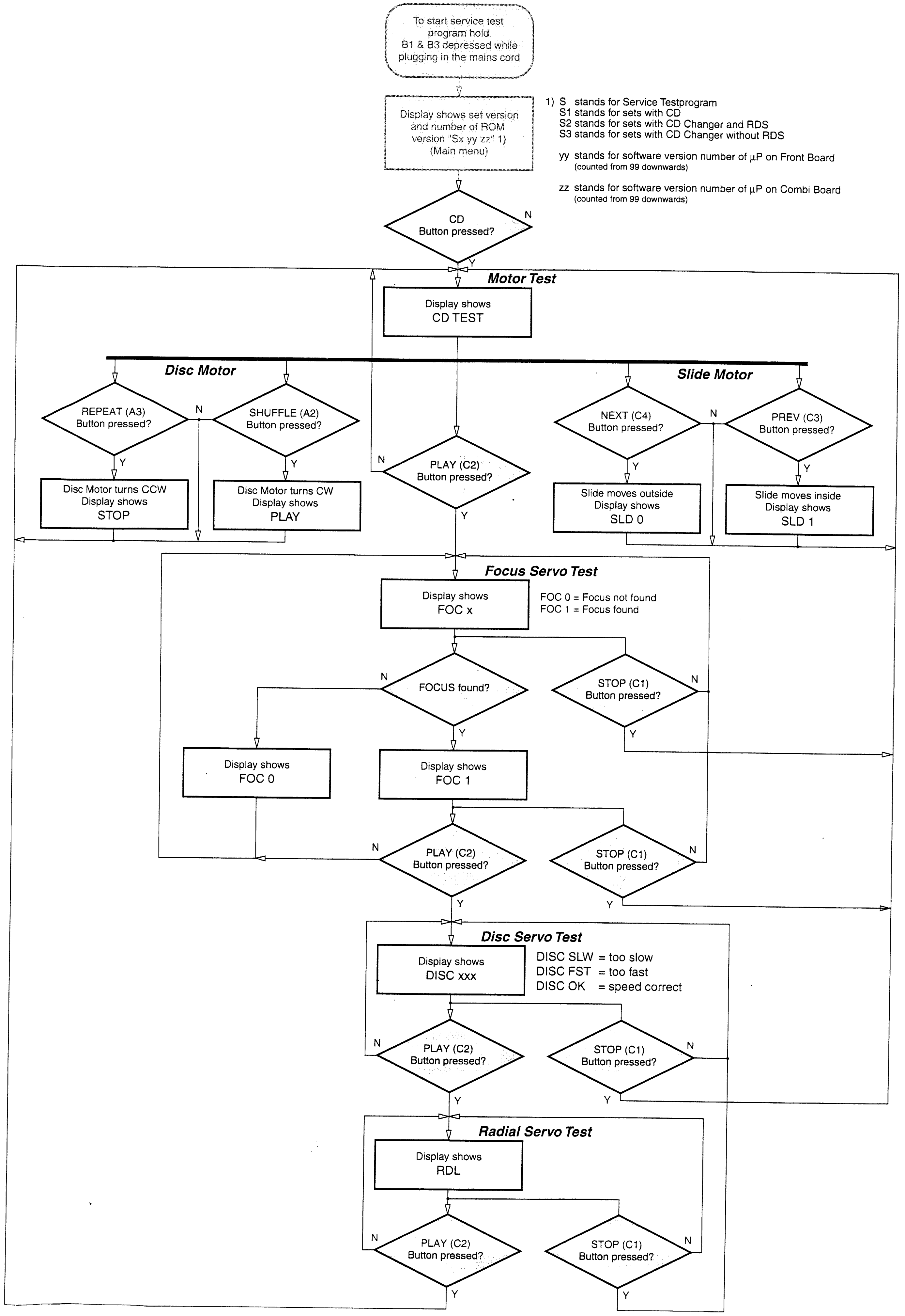
Error number	Error description	Error type
1002	Focus Error. Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during playing the CD.	F
1007	Subcode Error. No subcode could have been read, even not after retrying 10 times to restart the PLL and jumping 10 tracks. When this happens the servo is stopped and restarted (as if the user would have pressed stop and then play immediately) to recover.	W
1008	Out of lead-in during reading TOC Triggered when during reading the TOC the lead-in (track no. 0) is left. This can be caused by a misaligned inner-switch or by a disc with a mispositioned lead-in.	W
1010	Radial error Triggered when the radial servo is not on track for a certain time during playing the CD.	F
1011	Sledge error Generated when the inner-switch did not open within a certain time when the pick up is moved from the inner position outside.	W
1012	Fatal sledge error Generated when the inner-switch did not close within a certain time when the pick up is moved inside. Inner-switch or sledge motor problems.	F
1013	Turntable motor error. Generated when the CD did not reach 75% of speed during startup within a certain time. Discmotor problem.	F
1020	PLL lock error. When the PLL did not lock after 10 retries then this warning message is generated and the servo is stopped and restarted (as if the user would have pressed stop and then play immediately) to recover.	W
1079	Tray open position not reached within a certain time.	W

Error type W = Warning, F = Fatal Error

Table 3

Key activated	Display shows	Key activated	Display shows	Key activated	Display shows
CD open/close	8	C4	19	Power / Stand by	30
Demo	9	Timer/Clock	20	CD	31
A1	10	Display	21	TUNER	32
A2	11	Analyzer	22	TAPE 1	33
A3	12	DBB	23	TAPE 2	34
B1	13	Pop / Incredible Stereo	24	MULTI MEDIA	35
B2	14	Rock	25	Vocal Cancel	36
B3	15	Classic	26	Key Control down	37
C1	16	Jazz	27	Key control up	38
C2	17	Optimal User	leave Test	any RC5 Key	RC
C3	18	Brightness	29		

Table 4

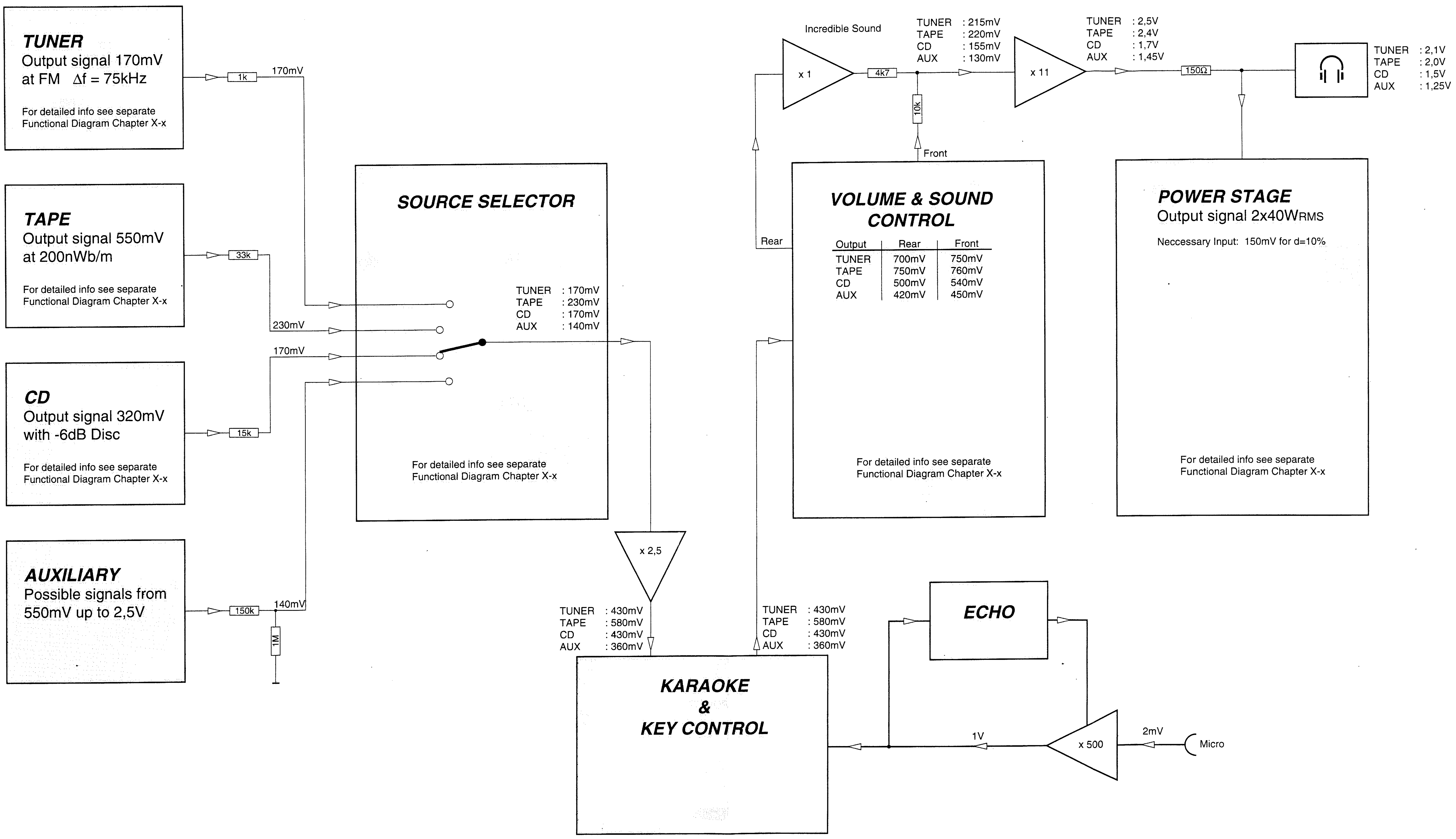

To start service test program hold B1 & B3 depressed while plugging in the mains cord
Display shows set version and number of ROM version "Sx yy zz" 1) (Main menu)
CD Button pressed?
N
Y
Motor Test
Display shows CD TEST
Disc Motor
Slide Motor
REPEAT (A3) Button pressed?
N
SHUFFLE (A2) Button pressed?
Y
Y
Disc Motor turns CCW Display shows STOP
Disc Motor turns CW Display shows PLAY
N
PLAY (C2) Button pressed?
Y
NEXT (C4) Button pressed?
N
PREV (C3) Button pressed?
Y
Y
Slide moves outside Display shows SLD 0
Slide moves inside Display shows SLD 1
Focus Servo Test
Display shows FOC x
FOC 0 = Focus not found
FOC 1 = Focus found
N
FOCUS found?
Y
STOP (C1) Button pressed?
N
Y
Display shows FOC 0
Display shows FOC 1
N
PLAY (C2) Button pressed?
Y
STOP (C1) Button pressed?
N
Y
Disc Servo Test
Display shows DISC xxx
DISC SLW = too slow
DISC FST = too fast
DISC OK = speed correct
N
PLAY (C2) Button pressed?
Y
STOP (C1) Button pressed?
N
Y
Radial Servo Test
Display shows RDL
N
PLAY (C2) Button pressed?
Y
STOP (C1) Button pressed?
N
Y

1) S stands for Service Testprogram
S1 stands for sets with CD
S2 stands for sets with CD Changer and RDS
S3 stands for sets with CD Changer without RDS

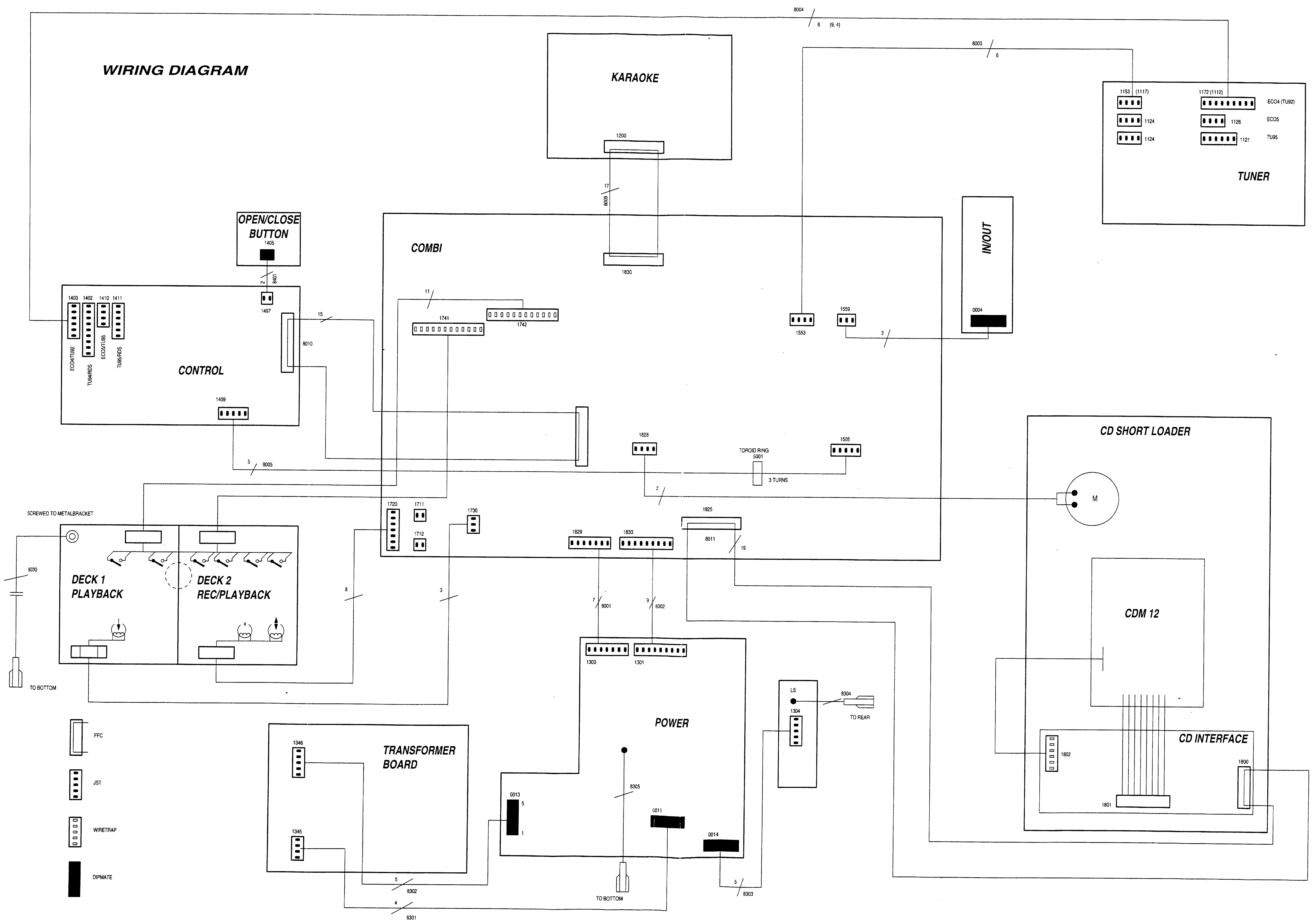
yy stands for software version number of µP on Front Board (counted from 99 downwards)

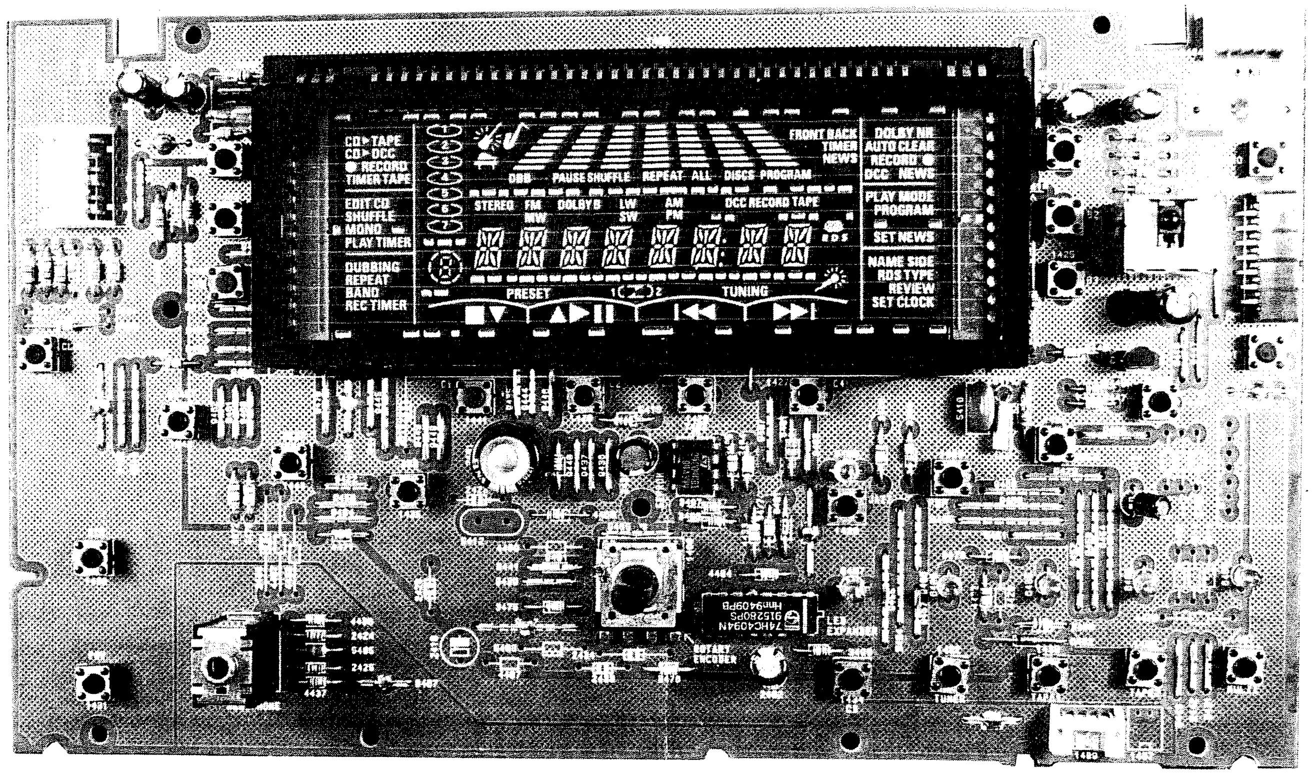
zz stands for software version number of µP on Combi Board (counted from 99 downwards)

BLOCK DIAGRAM SET


TUNER
Output signal 170mV
at FM Δf = 75kHz
For detailed info see separate
Functional Diagram Chapter X-x
TAPE
Output signal 550mV
at 200nWb/m
For detailed info see separate
Functional Diagram Chapter X-x
CD
Output signal 320mV
with -6dB Disc
For detailed info see separate
Functional Diagram Chapter X-x
AUXILIARY
Possible signals from
550mV up to 2,5V
1k
170mV
33k
230mV
170mV
15k
150k
140mV
1M
SOURCE SELECTOR
TUNER : 170mV
TAPE : 230mV
CD : 170mV
AUX : 140mV
For detailed info see separate
Functional Diagram Chapter X-x
x 2,5
TUNER : 430mV
TAPE : 580mV
CD : 430mV
AUX : 360mV
KARAOKE
&
KEY CONTROL
TUNER : 430mV
TAPE : 580mV
CD : 430mV
AUX : 360mV
ECHO
1V
x 500
2mV
Micro
Incredible Sound
x 1
4k7
10k
Front
Rear
TUNER : 215mV
TAPE : 220mV
CD : 155mV
AUX : 130mV
x 11
TUNER : 2,5V
TAPE : 2,4V
CD : 1,7V
AUX : 1,45V
150Ω
TUNER : 2,1V
TAPE : 2,0V
CD : 1,5V
AUX : 1,25V
VOLUME & SOUND
CONTROL
Output | Rear | Front
TUNER | 700mV | 750mV
TAPE | 750mV | 760mV
CD | 500mV | 540mV
AUX | 420mV | 450mV
For detailed info see separate
Functional Diagram Chapter X-x
POWER STAGE
Output signal 2x40WRMS
Neccessary Input: 150mV for d=10%
For detailed info see separate
Functional Diagram Chapter X-x

WIRING DIAGRAM


8004
6
(9, 4)
8003
6
KARAOKE
1200
17
8009
1830
TUNER
1153
(1117)
1124
1124
1172 (1112)
ECO4 (TU92)
1126
ECO5
1121
TU95
OPEN/CLOSE BUTTON
1405
2
8401
1497
CONTROL
1403
1402
1410
1411
ECO4/TU92
TU94/RDS
ECO5/TU95
TU95/RDS
8010
15
1409
5
8005
COMBI
11
1741
1742
1553
1559
3
IN/OUT
0004
1828
TOROID RING
5001
3 TURNS
1505
2
CD SHORT LOADER
M
1720
1711
1712
1730
1829
1833
1825
8011
19
SCREWED TO METALBRACKET
8030
DECK 1
PLAYBACK
DECK 2
REC/PLAYBACK
x
8
3
TO BOTTOM
7
8001
9
8002
CDM 12
1303
1301
POWER
LS
8304
TO REAR
1304
CD INTERFACE
1802
1800
1801
8305
0013
5
1
0011
0014
TRANSFORMER BOARD
1346
1345
5
8302
4
8301
TO BOTTOM
5
8303
FFC
JST
WIRETRAP
DIPMATE

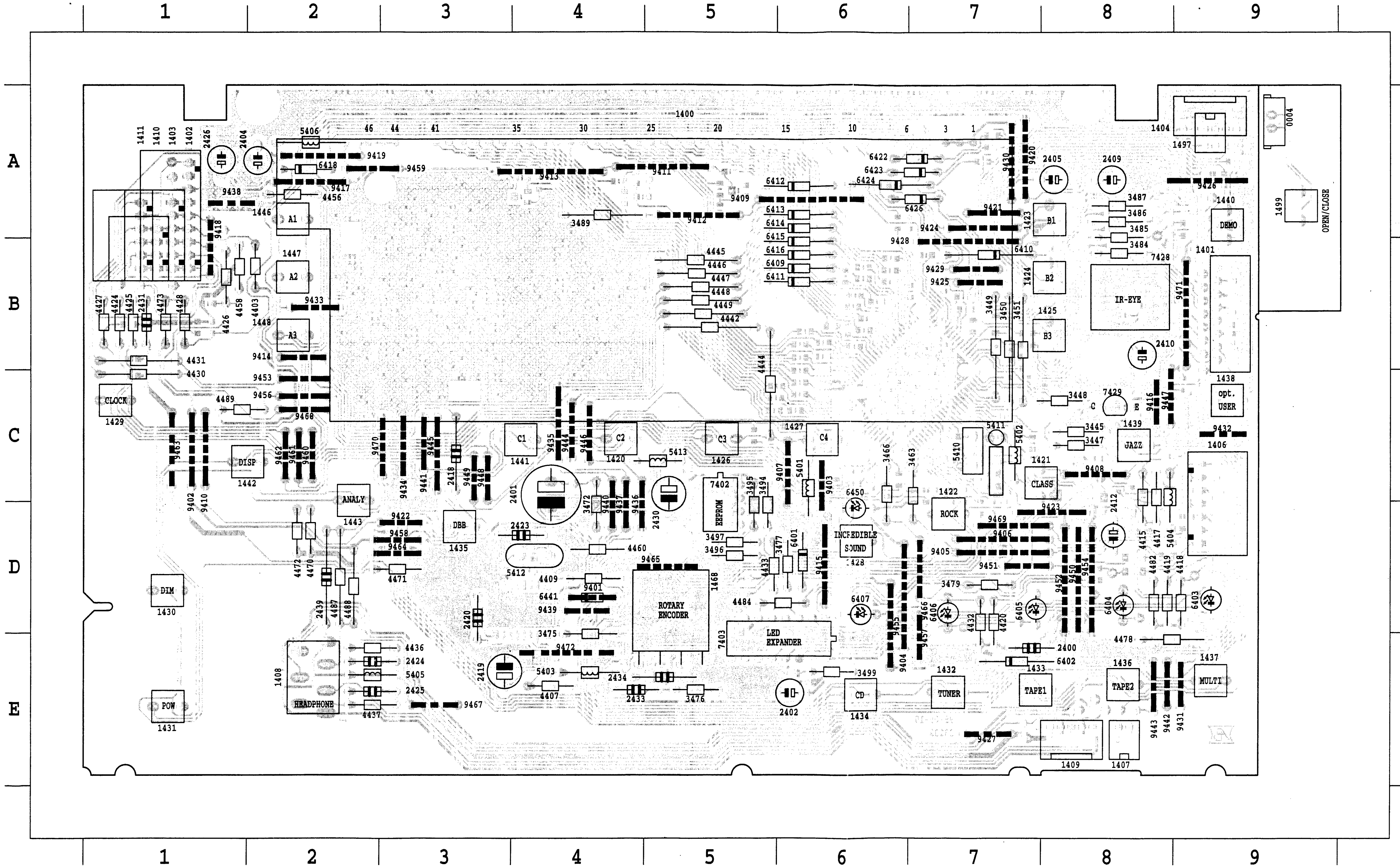


CONTROL BOARD

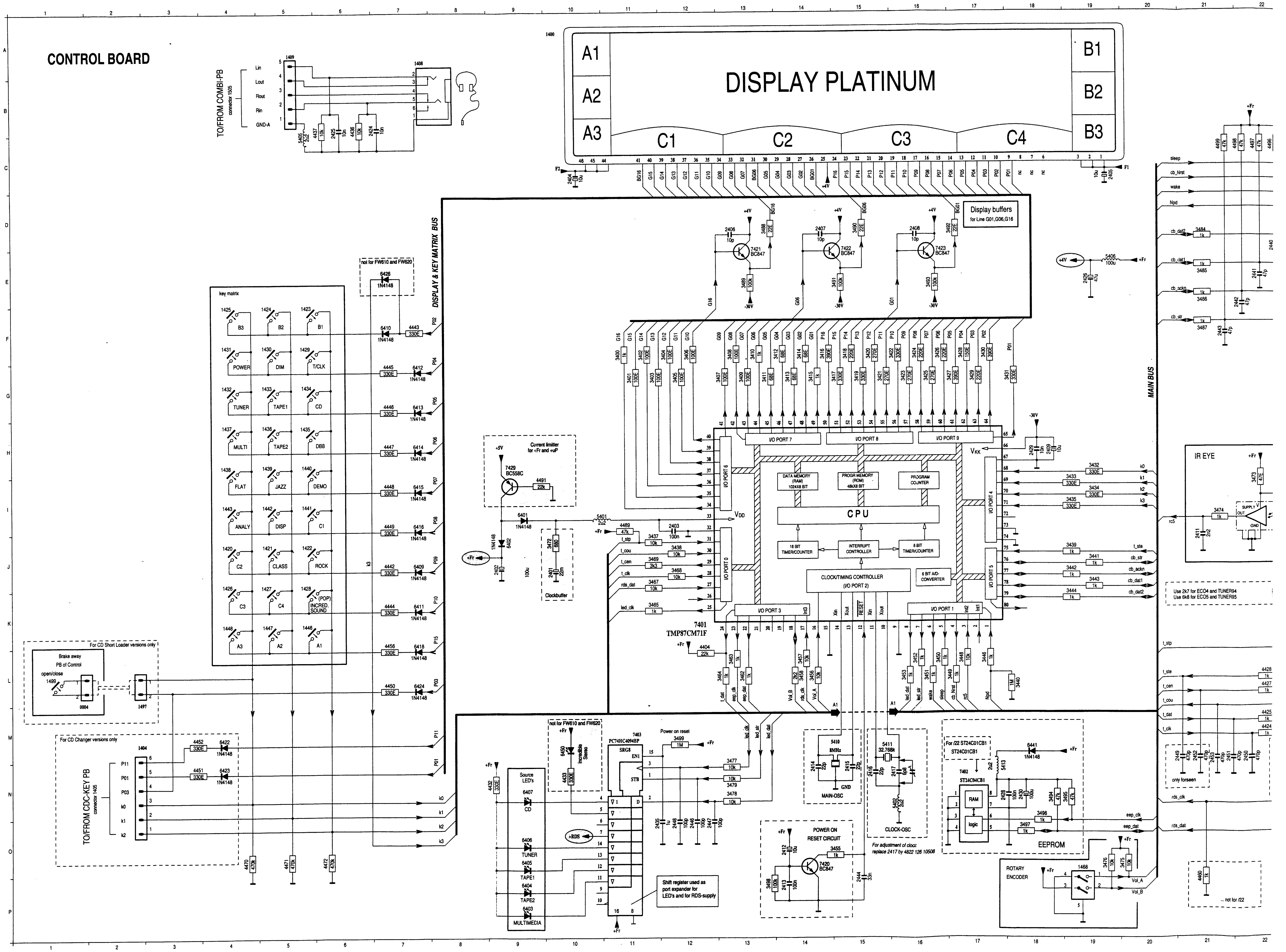
TABLE OF CONTENTS

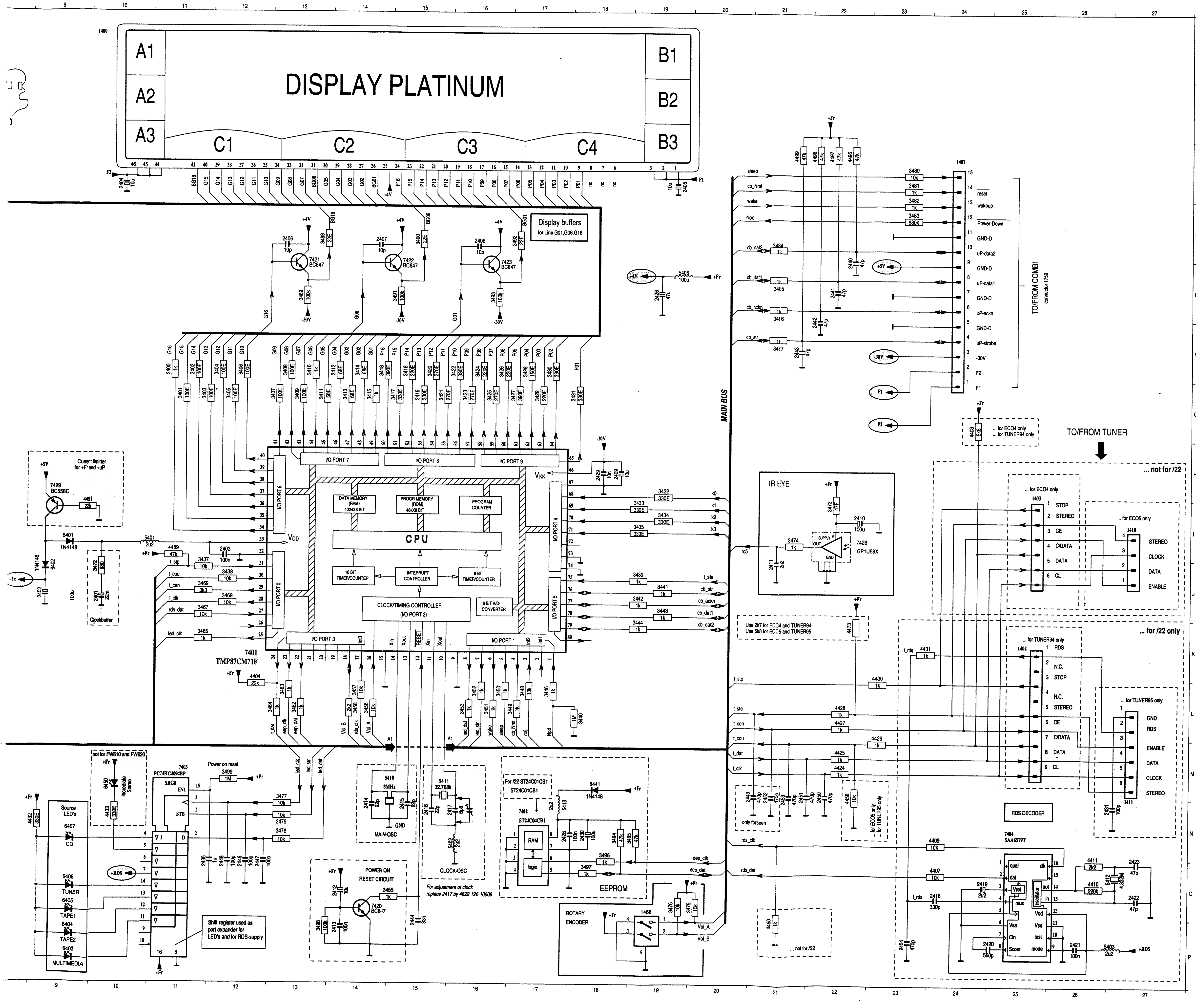
Component layout componentside view............................6-1
Circuit diagram 6-2
Component layout copperside view..................................6-3
CDC-keys 6-4
Partslist...6-4

COMPONENT LAYOUT COMPONENTSIDE VIEW


1
2
3
4
5
6
7
8
9
A
B
C
D
E
CLOCK
DISP
ANALY
DBB
DIM
POW
HEADPHONE
ROTARY ENCODER
EEPROM
LED EXPANDER
INCREDIBLE SOUND
CD
TUNER
TAPE1
TAPE2
MULTI
ROCK
CLASS
JAZZ
IR-EYE
DEMO
opt. USER
OPEN/CLOSE
A1
A2
A3
B1
B2
B3
C1
C2
C3
C4

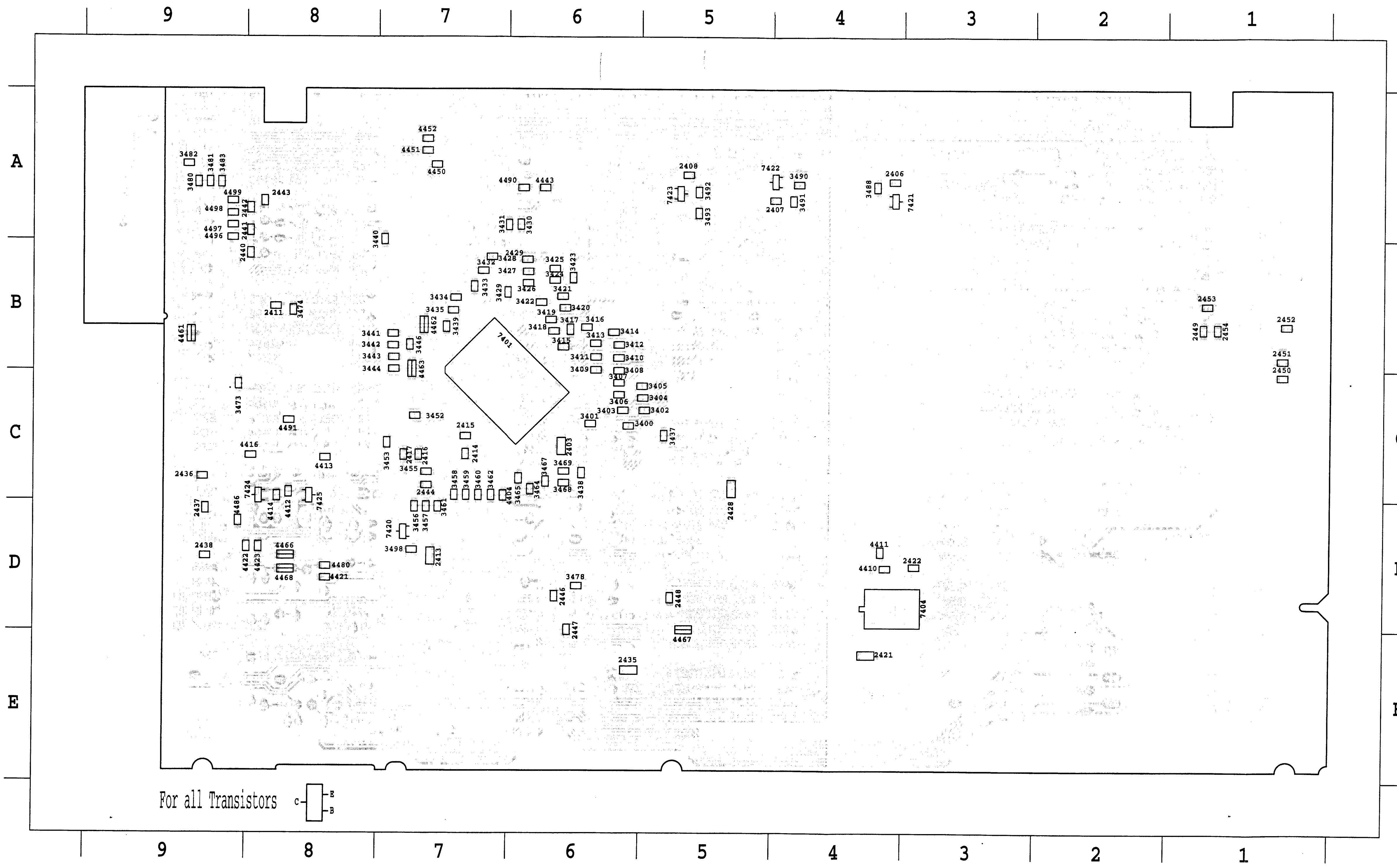
0004	A	9
1400	A	5
1401	B	9
1402	A	1
1403	A	1
1404	A	9
1406	D	9
1407	E	8
1408	E	2
1409	E	8
1410	B	1
1411	A	1
1420	C	4
1421	C	7
1422	D	7
1423	A	8
1424	B	8
1425	B	8
1426	C	5
1427	C	6
1428	D	6
1429	C	1
1430	D	1
1431	E	1
1432	E	7
1433	E	7
1434	E	6
1435	D	3
1436	E	8
1437	E	9
1438	C	9
1439	C	8
1440	A	9
1441	C	4
1442	C	2
1443	C	2
1446	A	2
1447	B	2
1448	B	2
1468	E	5
1497	A	9
1499	A	9
2400	E	7
2401	C	4
2402	E	6
2404	A	2
2405	A	8
2409	A	8
2410	B	8
2412	D	8
2418	C	3
2419	E	3
2420	D	3
2423	D	4
2424	E	2
2425	E	2
2426	A	1
2430	C	5
2431	B	1
2433	E	4
2434	E	5
2439	D	2
3445	C	8
3447	C	8
3448	C	8
3449	B	7
3450	B	7
3451	B	7
3463	C	7
3466	C	6
3472	D	4
3475	E	4
3476	E	5
3477	D	6
3479	D	7
3484	B	8
3485	A	8
3486	A	8
3487	A	8
3489	A	4
3494	D	5
3495	D	5
3496	D	5
3497	D	5
3499	E	6
4403	B	2
4407	E	4
4409	D	4
4415	C	8
4417	C	8
4418	D	9
4419	D	8
4420	D	7
4424	B	1
4425	B	1
4426	B	1
4427	B	1
4428	B	1
4430	C	1
4431	B	1
4432	D	7
4433	D	5
4436	E	2
4437	E	2
4442	B	5
4444	C	5
4445	B	5
4446	B	5
4447	B	5
4448	B	5
4449	B	5
4456	A	2
4458	B	1
4460	D	4
4470	D	2
4471	D	3
4472	D	2
4473	B	1
4478	E	8
4482	D	8
4484	D	6
4487	D	2
4488	D	2
4489	C	1
5401	C	6
5402	C	7
5403	E	4
5404	C	8
5405	E	2
5406	A	2
5410	C	7
5411	C	7
5412	D	4
5413	C	5
6401	D	6
6402	E	7
6403	D	9
6404	D	8
6405	D	7
6406	D	7
6407	D	6
6409	B	6
6410	B	7
6411	B	6
6412	A	6
6413	A	6
6414	A	6
6415	B	6
6416	B	6
6418	A	2
6422	A	7
6423	A	7
6424	A	6
6426	A	7
6441	D	4
6450	D	6
7402	D	5
7403	E	6
7428	B	8
7429	C	8
9401	D	4
9402	C	1
9403	C	6
9404	D	6
9405	D	7
9406	D	7
9407	C	6
9408	C	8
9409	A	6
9410	C	1
9411	A	5
9412	A	5
9413	A	4
9414	B	2
9415	D	6
9416	C	8
9417	A	2
9418	B	1
9419	A	2
9420	A	7
9421	A	7
9422	D	3
9423	D	8
9424	A	7
9425	B	7
9426	A	9
9427	E	7
9428	B	7
9429	B	7
9430	A	7
9431	E	9
9432	C	9
9433	B	2
9434	C	3
9435	C	4
9436	D	4
9437	D	4
9438	A	1
9439	D	4
9440	D	4
9441	C	3
9442	E	8
9443	E	8
9444	C	4
9445	C	3
9446	C	4
9447	C	8
9448	C	3
9449	C	3
9450	D	8
9451	D	7
9452	D	8
9453	C	2
9454	D	8
9455	D	6
9456	C	2
9457	E	7
9458	D	3
9459	A	2
9460	C	2
9461	C	2
9462	C	2
9463	C	1
9464	D	3
9465	D	5
9466	D	7
9467	E	3
9468	C	2
9469	D	7
9470	C	3
9471	B	9
9472	E	4


CONTROL BOARD
DISPLAY PLATINUM
A1
A2
A3
B1
B2
B3
C1
C2
C3
C4
TO/FROM COMBI-PB connector 1505
Lin
Lout
Rout
Rin
GND-A
key matrix
B3
B2
B1
POWER
DIM
T/CLK
TUNER
TAPE1
CD
MULTI
TAPE2
DBB
FLAT
JAZZ
DEMO
ANALY
DISP
C1
C2
CLASS
ROCK
C3
C4
(POP) INCRED. SOUND
A3
A2
A1
not for FW610 and FW620
DISPLAY & KEY MATRIX BUS
Display buffers for Line G01,G06,G16
7421 BC847
7422 BC847
7423 BC847
Current limitter for +Fr and +uP
7429 BC558C
Clockbuffer
For CD Short Loader versions only
Brake away PB of Control
open/close
For CD Changer versions only
TO/FROM CDC-KEY PB connector 1405
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT 6
I/O PORT 0
I/O PORT 4
I/O PORT 5
I/O PORT 3
I/O PORT 1
DATA MEMORY (RAM) 1024X8 BIT
PROGR MEMORY (ROM) 48KX8 BIT
PROGRAM COUNTER
CPU
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
8 BIT A/D-CONVERTER
VDD
VKK
7401 TMP87CM71F
MAIN BUS
IR EYE
Use 2k7 for ECO4 and TUNER94
Use 6k8 for ECO5 and TUNER95
Power on reset
7403 PC74HC4094BP
SRG8
EN1
STB
Source LED's
CD
TUNER
TAPE1
TAPE2
MULTIMEDIA
Incredible Stereo
Shift register used as port expander for LED's and for RDS-supply
MAIN-OSC
5410 8MHz
5411 32.768k
CLOCK-OSC
For adjustment of clock: replace 2417 by 4822 126 10508
POWER ON RESET CIRCUIT
7420 BC847
For /22 ST24C01CB1
7402 ST24C04CB1
RAM
logic
EEPROM
ROTARY ENCODER
only forseen
...not for /22
sleep
cb_Nrst
wake
Npd
cb_dat2
cb_dat1
cb_ackn
cb_str
t_ste
t_cen
t_cou
t_dat
t_clk
t_stp
rds_dat
rds_clk
led_clk
eep_clk
eep_dat
Vol_A
Vol_B
k0
k1
k2
k3
rc5


DISPLAY PLATINUM
1400
A1
A2
A3
B1
B2
B3
C1
C2
C3
C4
Display buffers
for Line G01,G06,G16
7421 BC847
7422 BC847
7423 BC847
MAIN BUS
7401
TMP87CM71F
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT 6
I/O PORT 0
I/O PORT 4
I/O PORT 5
I/O PORT 3
I/O PORT 1
DATA MEMORY (RAM) 1024X8 BIT
PROGR MEMORY (ROM) 48kX8 BIT
PROGRAM COUNTER
CPU
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
8 BIT A/D-CONVERTER
VDD
VKK
Current limiter for +Fr and +uP
7429 BC558C
Clockbuffer
IR EYE
7428 GP1U58X
TO/FROM COMBI
connector 1750
1401
reset
wakeup
Power-Down
GND-D
uP-data2
uP-data1
uP-ackn
uP-strobe
-30V
F2
F1
sleep
cb_Nrst
wake
Npd
cb_dat2
cb_dat1
cb_ackn
cb_str
TO/FROM TUNER
... not for /22
... for /22 only
... for ECO4 only
... for TUNER94 only
... for ECO5 only
... for TUNER95 only
1403
1402
1410
1411
STOP
STEREO
CE
C/DATA
DATA
CL
RDS
N.C.
GND
ENABLE
CLOCK
Use 2k7 for ECO4 and TUNER94
Use 6k8 for ECO5 and TUNER95
RDS DECODER
7404 SAA6579T
qual
clk
dat
Vref
mux
oscillator
out
in
Vdd
Vss
Vsd
Cin
test
Scout
mode
not for FW610 and FW620
Incredible Stereo
7403 PC74HC4094BP
SRG8
EN1
STB
Power on reset
Source LED's
CD
TUNER
TAPE1
TAPE2
MULTIMEDIA
Shift register used as port expander for LED's and for RDS-supply
MAIN-OSC
5410 8MHz
CLOCK-OSC
5411 32.768k
For adjustment of clock replace 2417 by 4822 126 10508
POWER ON RESET CIRCUIT
7420 BC847
For /22 ST24C01CB1
ST24C01CB1
7402 ST24C04CB1
RAM
logic
EEPROM
ROTARY ENCODER
1468
Vol_A
Vol_B
only forseen
... for ECO5 only ... for TUNER95 only
... not for /22
+RDS
+Fr
+4V
+5V
-30V
t_stp
t_cou
t_cen
t_clk
rds_dat
led_clk
t_dat
t_ste
t_rds
eep_clk
eep_dat
rds_clk
led_dat
led_str
rc5
Vol_A
Vol_B
k0
k1
k2
k3
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P

0004	L 1	3487	F21
1400	A10	3488	D13
1401	C24	3489	E13
1402	K25	3490	D15
1403	H25	3491	E14
1404	M 3	3492	D17
1408	A 7	3493	E16
1409	A 5	3494	N18
1410	I27	3495	N19
1411	N27	3496	N18
1420	J 4	3497	O18
1421	J 5	3498	P13
1422	J 5	3499	M12
1423	F 5	4403	G24
1424	F 5	4404	L12
1425	F 4	4407	O24
1426	J 4	4409	N24
1427	J 5	4410	O26
1428	J 5	4411	N26
1429	F 5	4424	M22
1430	F 5	4425	M22
1431	F 4	4426	L23
1432	G 4	4427	L22
1433	G 5	4428	L22
1434	G 5	4430	K23
1435	H 5	4431	K23
1436	H 5	4432	N 9
1437	H 4	4433	N10
1438	H 4	4436	B 6
1439	H 5	4437	B 6
1440	H 5	4442	J 7
1441	I 5	4443	F 7
1442	I 5	4444	K 7
1443	I 4	4445	G 7
1446	K 5	4446	G 7
1447	K 5	4447	H 7
1448	K 4	4448	I 7
1468	O19	4449	I 7
1497	L 3	4450	L 7
1499	L 1	4451	N 3
2401	J10	4452	M 3
2402	J 9	4456	K 7
2403	I12	4458	M22
2404	C10	4460	P21
2405	C19	4470	O 4
2406	D13	4471	O 5
2407	D14	4472	O 6
2408	D16	4473	K22
2409	H18	4489	I11
2410	I22	4491	I 9
2411	J21	4496	C22
2412	O14	4497	C22
2413	P14	4498	C22
2414	N14	4499	C21
2415	N15	5401	I10
2416	N15	5402	N16
2417	N16	5403	P27
2418	O24	5405	B 5
2419	O24	5406	E19
2420	P25	5410	M15
2421	P26	5411	M15
2422	O27	5412	O27
2423	O27	5413	N17
2424	B 6	6401	I 9
2425	B 6	6402	J 9
2426	E19	6403	P 9
2428	N17	6404	P 9
2429	H18	6405	O 9
2430	N18	6406	O 9
2431	N27	6407	N 9
2435	O11	6409	J 7
2440	E22	6410	F 7
2441	E22	6411	K 7
2442	F22	6412	G 7
2443	F21	6413	G 7
2444	P15	6414	H 7
2445	N16	6415	I 7
2446	O12	6416	I 7
2447	O12	6418	L 7
2448	O12	6422	M 4
2449	M21	6423	N 4
2450	M22	6424	L 7
2451	M21	6426	E 7
2452	M21	6441	M18
2453	M21	6450	M10
2454	P23	7401	K12
3400	F11	7402	N17
3401	G11	7403	M11
3402	F11	7404	N25
3403	G11	7420	O14
3404	F12	7421	D13
3405	G12	7422	D14
3406	F12	7423	D16
3407	G13	7428	I22
3408	F13	7429	H 9
3409	G13	9401	M18
3410	F13		
3411	G13		
3412	F14		
3413	G14		
3414	F14		
3415	G14		
3416	F14		
3417	G15		
3418	F15		
3419	G15		
3420	F15		
3421	G15		
3422	F16		
3423	G16		
3424	F16		
3425	G16		
3426	F16		
3427	G17		
3428	F17		
3429	G17		
3430	F17		
3431	G18		
3432	H19		
3433	I19		
3434	I19		
3435	I19		
3437	J11		
3438	J12		
3439	J19		
3440	L18		
3441	J19		
3442	J19		
3443	J19		
3444	K19		
3445	L18		
3446	L17		
3449	L17		
3450	L16		
3451	L16		
3452	L16		
3453	L16		
3455	O15		
3456	L14		
3457	L14		
3458	L14		
3462	L13		
3463	L13		
3464	L13		
3465	K11		
3467	J11		
3468	J12		
3469	J11		
3472	J10		
3473	I22		
3474	I21		
3475	O20		
3476	O19		
3477	N13		
3478	N13		
3479	N13		
3480	C23		
3481	C23		
3482	C23		
3483	D23		
3484	D21		
3485	E21		
3486	E21		

COMPONENT LAYOUT COPPERSIDE VIEW


9
8
7
6
5
4
3
2
1
A
B
C
D
E
7401
7404
7420
7421
7422
7423
7424
7425
For all Transistors
C
E
B

2403	C	6
2406	A	4
2407	A	4
2408	A	5
2411	B	8
2413	D	7
2414	C	7
2415	C	7
2416	C	7
2417	C	7
2421	E	4
2422	D	3
2428	C	5
2429	B	7
2435	E	6
2436	C	9
2437	D	9
2438	D	9
2440	B	8
2441	A	8
2442	A	8
2443	A	8
2444	C	7
2446	D	6
2447	D	6
2448	D	5
2449	B	1
2450	C	1
2451	B	1
2452	B	1
2453	B	1
2454	B	1
3400	C	6
3401	C	6
3402	C	5
3403	C	6
3404	C	5
3405	C	5
3406	C	6
3407	C	6
3408	C	6
3409	B	6
3410	B	6
3411	B	6
3412	B	6
3413	B	6
3414	B	6
3415	B	6
3416	B	6
3417	B	6
3418	B	6
3419	B	6
3420	B	6
3421	B	6
3422	B	6
3423	B	6
3424	B	6
3425	B	6
3426	B	6
3427	B	6
3428	B	6
3429	B	7
3430	A	6
3431	A	7

MISCELLANEOUS

1400	4822 130 91488	DISPLAY
1408	4822 267 31919	PHONE SOCKET
1420	4822 276 13114	TACT SWITCH
1421	4822 276 13114	TACT SWITCH
1422	4822 276 13114	TACT SWITCH
1423	4822 276 13114	TACT SWITCH
1424	4822 276 13114	TACT SWITCH
1425	4822 276 13114	TACT SWITCH
1426	4822 276 13114	TACT SWITCH
1427	4822 276 13114	TACT SWITCH
1428	4822 276 13114	TACT SWITCH
1429	4822 276 13114	TACT SWITCH
1430	4822 276 13114	TACT SWITCH
1431	4822 276 13114	TACT SWITCH
1432	4822 276 13114	TACT SWITCH
1433	4822 276 13114	TACT SWITCH
1434	4822 276 13114	TACT SWITCH
1435	4822 276 13114	TACT SWITCH
1436	4822 276 13114	TACT SWITCH
1437	4822 276 13114	TACT SWITCH
1438	4822 276 13114	TACT SWITCH
1439	4822 276 13114	TACT SWITCH
1440	4822 276 13114	TACT SWITCH
1441	4822 276 13114	TACT SWITCH
1442	4822 276 13114	TACT SWITCH
1443	4822 276 13114	TACT SWITCH
1446	4822 276 13114	TACT SWITCH
1447	4822 276 13114	TACT SWITCH
1448	4822 276 13114	TACT SWITCH
1468	4822 101 21261	ROTARY ENCODER
1499	4822 276 13114	TACT SWITCH

DIODES

6401	4822 130 30621	1N4148
6402	4822 130 30621	1N4148
6403	4822 130 82978	LED LTL-16KPE
6404	4822 130 82978	LED LTL-16KPE
6405	4822 130 82978	LED LTL-16KPE
6406	4822 130 82978	LED LTL-16KPE
6407	4822 130 82978	LED LTL-16KPE
6409	4822 130 30621	1N4148
6410	4822 130 30621	1N4148
6411	4822 130 30621	1N4148
6412	4822 130 30621	1N4148
6413	4822 130 30621	1N4148
6414	4822 130 30621	1N4148
6415	4822 130 30621	1N4148
6416	4822 130 30621	1N4148
6418	4822 130 30621	1N4148
6422	4822 130 30621	1N4148
6423	4822 130 30621	1N4148
6424	4822 130 30621	1N4148
6426	4822 130 30621	1N4148
6441	4822 130 30621	1N4148
6450	4822 130 83363	LED LTL-16KGE

TRANSISTORS

7420	5322 130 42755	BC847C
7421	5322 130 42755	BC847C
7422	5322 130 42755	BC847C
7423	5322 130 42755	BC847C
7429	5322 130 60068	BC558C

INTEGRATED CIRCUITS

7401	4822 209 90995	TMP87CP71F-65SV83021
7402	4822 209 32709	ST24C04CB1 not for /22
7402	4822 209 31508	ST24C01CB1 only for /22
7403	5322 209 11532	PC74HC4094P
7404	4822 209 31981	SAA6579T/V1
7428	4822 214 52009	GP1U58XP

COILS

5401	4822 157 62552	2,2µH
5402	4822 157 62552	2,2µH
5403	4822 157 62552	2,2µH
5405	4822 157 62552	2,2µH
5406	4822 157 52333	100µH 10%
5410	5322 242 73697	CER.RES. 8MHz
5411	4822 242 70938	XTAL 32,768kHz
5412	4822 242 72195	XTAL 4,332MHz
5413	4822 157 62552	2,2µH

RESISTORS

3449	4822 050 11002	1k	5%	0,2W
3450	4822 050 11002	1k	5%	0,2W
3451	4822 050 11002	1k	5%	0,2W
3463	4822 050 11002	1k	5%	0,2W
3472	4822 116 52228	680R	5%	0,5W
3475	4822 116 83864	10k	5%	0,5W
3476	4822 116 83864	10k	5%	0,5W
3477	4822 116 83864	10k	5%	0,5W
3479	4822 116 83864	10k	5%	0,5W
3484	4822 050 11002	1k	5%	0,2W
3485	4822 050 11002	1k	5%	0,2W
3486	4822 050 11002	1k	5%	0,2W
3487	4822 050 11002	1k	5%	0,2W
3489	4822 116 52234	100k	5%	0,5W
3494	4822 116 52284	47k	5%	0,5W
3495	4822 116 52284	47k	5%	0,5W
3496	4822 050 11002	1k	5%	0,2W
3497	4822 050 11002	1k	5%	0,2W
3499	4822 116 52235	1M	5%	0,5W
4403	4822 116 52289	5k6	5%	0,16W
4407	4822 116 83864	10k	5%	0,5W
4409	4822 116 83864	10k	5%	0,5W
4424	4822 050 11002	1k	5%	0,2W
4425	4822 050 11002	1k	5%	0,2W
4426	4822 050 11002	1k	5%	0,2W
4427	4822 050 11002	1k	5%	0,2W
4428	4822 050 11002	1k	5%	0,2W
4430	4822 050 11002	1k	5%	0,2W
4431	4822 050 11002	1k	5%	0,2W
4432	4822 116 52219	330R	5%	0,5W
4433	4822 116 52219	330R	5%	0,5W
4436	4822 116 83864	10k	5%	0,5W
4437	4822 116 83864	10k	5%	0,5W
4442	4822 116 52219	330R	5%	0,5W
4444	4822 116 52219	330R	5%	0,5W

RESISTORS

4445	4822 116 52219	330R	5%	0,5W	
4446	4822 116 52219	330R	5%	0,5W	
4447	4822 116 52219	330R	5%	0,5W	
4448	4822 116 52219	330R	5%	0,5W	
4449	4822 116 52219	330R	5%	0,5W	
4456	4822 116 52219	330R	5%	0,5W	
4458	4822 116 83864	10k	5%	0,5W	
4460	4822 050 11002	1k	5%	0,2W	
4470	4822 116 52285	470k	5%	0,16W	
4471	4822 116 52285	470k	5%	0,16W	
4472	4822 116 52285	470k	5%	0,16W	
4473	4822 116 52263	2k7	5%	0,5W	for ECO4,Tuner94
4473	4822 116 52296	6k8	5%	0,5W	for ECO5,Tuner95
4489	4822 116 52284	47k	5%	0,5W	

CHIP RESISTORS

3400	4822 051 10102	1k	2%	0,25W
3401	4822 051 20101	100R	5%	0,1W
3402	4822 051 20101	100R	5%	0,1W
3403	4822 051 20101	100R	5%	0,1W
3404	4822 051 20101	100R	5%	0,1W
3405	4822 051 20101	100R	5%	0,1W
3406	4822 051 20101	100R	5%	0,1W
3407	4822 051 20101	100R	5%	0,1W
3408	4822 051 20101	100R	5%	0,1W
3409	4822 051 20101	100R	5%	0,1W
3410	4822 051 10102	1k	2%	0,25W
3411	4822 051 20689	68R	5%	0,1W
3412	4822 051 20689	68R	5%	0,1W
3413	4822 051 20689	68R	5%	0,1W
3414	4822 051 20689	68R	5%	0,1W
3415	4822 051 10102	1k	2%	0,25W
3416	4822 051 20391	390R	5%	0,1W
3417	4822 051 20331	330R	5%	0,1W
3418	4822 051 20221	220R	5%	0,1W
3419	4822 051 20331	330R	5%	0,1W
3420	4822 051 20271	270R	5%	0,1W
3421	4822 051 20271	270R	5%	0,1W
3422	4822 051 20331	330R	5%	0,1W
3423	4822 051 20271	270R	5%	0,1W
3424	4822 051 20221	220R	5%	0,1W
3425	4822 051 20271	270R	5%	0,1W
3426	4822 051 20221	220R	5%	0,1W
3427	4822 051 20391	390R	5%	0,1W
3428	4822 051 20151	150R	5%	0,1W
3429	4822 051 20221	220R	5%	0,1W
3430	4822 051 20391	390R	5%	0,1W
3431	4822 051 20331	330R	5%	0,1W
3432	4822 051 20331	330R	5%	0,1W
3433	4822 051 20331	330R	5%	0,1W
3434	4822 051 20331	330R	5%	0,1W
3435	4822 051 20331	330R	5%	0,1W
3437	4822 051 20103	10k	5%	0,1W
3438	4822 051 20103	10k	5%	0,1W
3439	4822 051 10102	1k	2%	0,25W
3440	4822 051 20105	1M	5%	0,1W
3441	4822 051 10102	1k	2%	0,25W
3442	4822 051 10102	1k	2%	0,25W
3443	4822 051 10102	1k	2%	0,25W
3444	4822 051 10102	1k	2%	0,25W
3446	4822 051 10102	1k	2%	0,25W

CHIP RESISTORS

3452	4822 051 10102	1k	2%	0,25W
3453	4822 051 10102	1k	2%	0,25W
3455	4822 051 10102	1k	2%	0,25W
3456	4822 051 20103	10k	5%	0,1W
3457	4822 051 20103	10k	5%	0,1W
3458	4822 051 20222	2k2	5%	0,1W
3462	4822 051 10102	1k	2%	0,25W
3464	4822 051 10102	1k	2%	0,25W
3465	4822 051 10102	1k	2%	0,25W
3467	4822 051 20103	10k	5%	0,1W
3468	4822 051 20103	10k	5%	0,1W
3469	4822 051 20332	3k3	5%	0,1W
3473	4822 051 20479	47R	5%	0,1W
3474	4822 051 10102	1k	2%	0,25W
3478	4822 051 20103	10k	5%	0,1W
3480	4822 051 20103	10k	5%	0,1W
3481	4822 051 10102	1k	2%	0,25W
3482	4822 051 10102	1k	2%	0,25W
3483	4822 051 20684	680k	5%	0,1W
3488	4822 051 20229	22R	5%	0,1W
3490	4822 051 20229	22R	5%	0,1W
3491	4822 051 20104	100k	5%	0,1W
3492	4822 051 20229	22R	5%	0,1W
3493	4822 051 20104	100k	5%	0,1W
3498	4822 051 20104	100k	5%	0,1W
4404	4822 051 20223	22k	5%	0,1W
4410	4822 051 20224	220k	5%	0,1W
4411	4822 051 20222	2k2	5%	0,1W
4443	4822 051 20331	330R	5%	0,1W
4450	4822 051 20331	330R	5%	0,1W
4451	4822 051 20331	330R	5%	0,1W
4452	4822 051 20331	330R	5%	0,1W
4461	4822 051 10008	CHIP JUMPER 1206		
4462	4822 051 10008	CHIP JUMPER 1206		
4463	4822 051 10008	CHIP JUMPER 1206		
4467	4822 051 10008	CHIP JUMPER 1206		
4491	4822 051 20223	22k	5%	0,1W
4496	4822 051 20473	47k	5%	0,1W
4497	4822 051 20473	47k	5%	0,1W
4498	4822 051 20473	47k	5%	0,1W
4499	4822 051 20473	47k	5%	0,1W

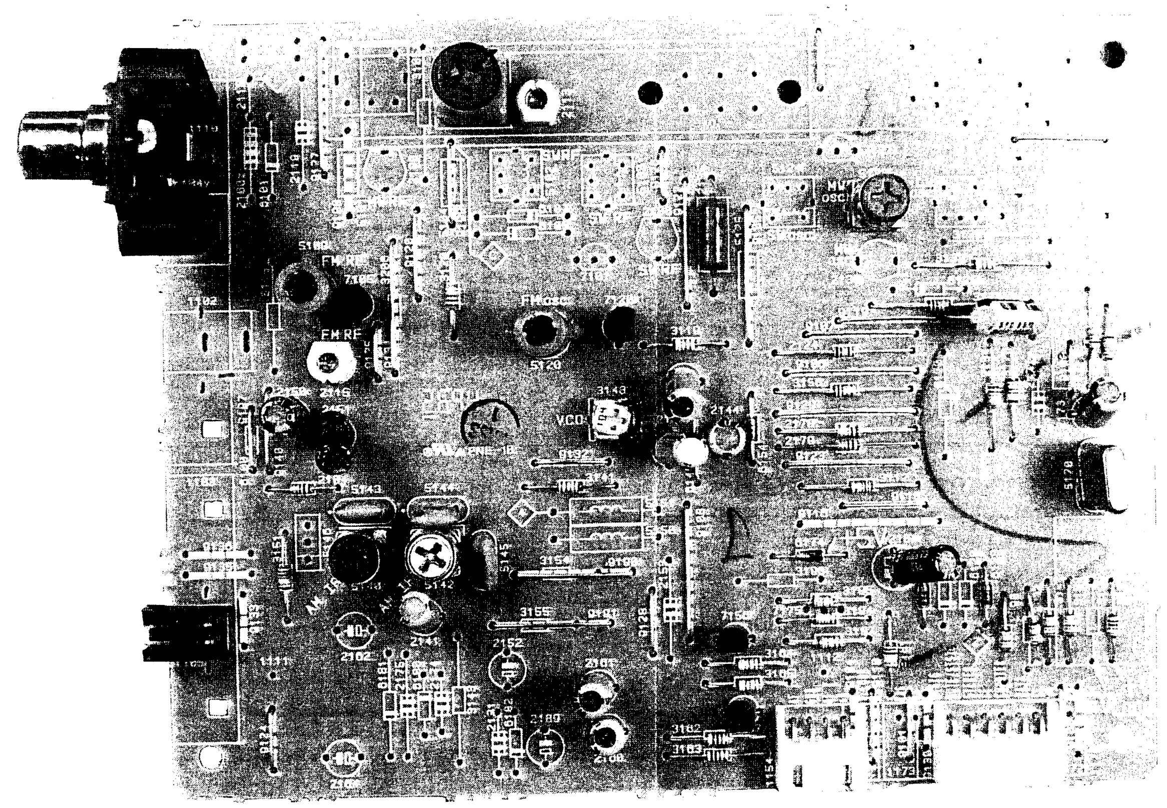
CAPACITORS

2401	4822 124 80818	22mF	20%	5,5V
2402	4822 124 41584	100µF	20%	10V
2404	4822 124 41579	10µF	20%	50V
2405	4822 124 41579	10µF	20%	50V
2409	4822 124 41579	10µF	20%	50V
2410	4822 124 41584	100µF	20%	10V
2412	4822 124 22403	10µF	20%	16V
2418	4822 126 12787	330pF	10%	50V
2419	4822 124 41576	2,2µF	20%	50V
2420	4822 122 10459	560pF	10%	50V
2423	4822 122 33848	47pF	5%	50V
2424	4822 121 51387	10nF	20%	16V
2425	4822 121 51387	10nF	20%	16V
2426	4822 124 40433	47µF	20%	25V
2430	4822 124 42234	100µF	20%	6,3V
2431	4822 122 33195	100pF	10%	50V
2403	4822 122 33496	100nF	10%	63V
2406	5322 122 32448	10pF	5%	50V

ELECTRICAL PARTSLIST CONTROL BOARD

CHIP CAPACITORS

2407	5322 122 32448	10pF	5%	50V
2408	5322 122 32448	10pF	5%	50V
2411	4822 122 33175	2.2nF	20%	50V
2413	4822 122 33496	100nF	10%	63V
2414	5322 122 32658	22pF	5%	50V
2415	5322 122 32658	22pF	5%	50V
2416	5322 122 32658	22pF	5%	50V
2417	5322 122 32269	6.8pF	5%	50V
2421	4822 122 33496	100nF	10%	63V
2422	5322 122 32452	47pF	5%	50V
2428	4822 122 33496	100nF	10%	63V
2429	4822 122 33177	10nF	20%	50V
2435	4822 126 11692	1µF	20%	16V
2440	5322 122 32452	47pF	5%	50V
2441	5322 122 32452	47pF	5%	50V
2442	5322 122 32452	47pF	5%	50V
2443	5322 122 32452	47pF	5%	50V
2444	4822 122 33342	33nF	10%	63V
2446	5322 122 32531	100pF	5%	50V
2447	5322 122 32531	100pF	5%	50V
2448	5322 122 32531	100pF	5%	50V
2449	5322 122 34099	470pF	10%	63V
2450	5322 122 34099	470pF	10%	63V
2451	5322 122 34099	470pF	10%	63V
2452	5322 122 34099	470pF	10%	63V
2453	5322 122 34099	470pF	10%	63V
2454	5322 122 34099	470pF	10%	63V



TUNER BOARD ECO4VA

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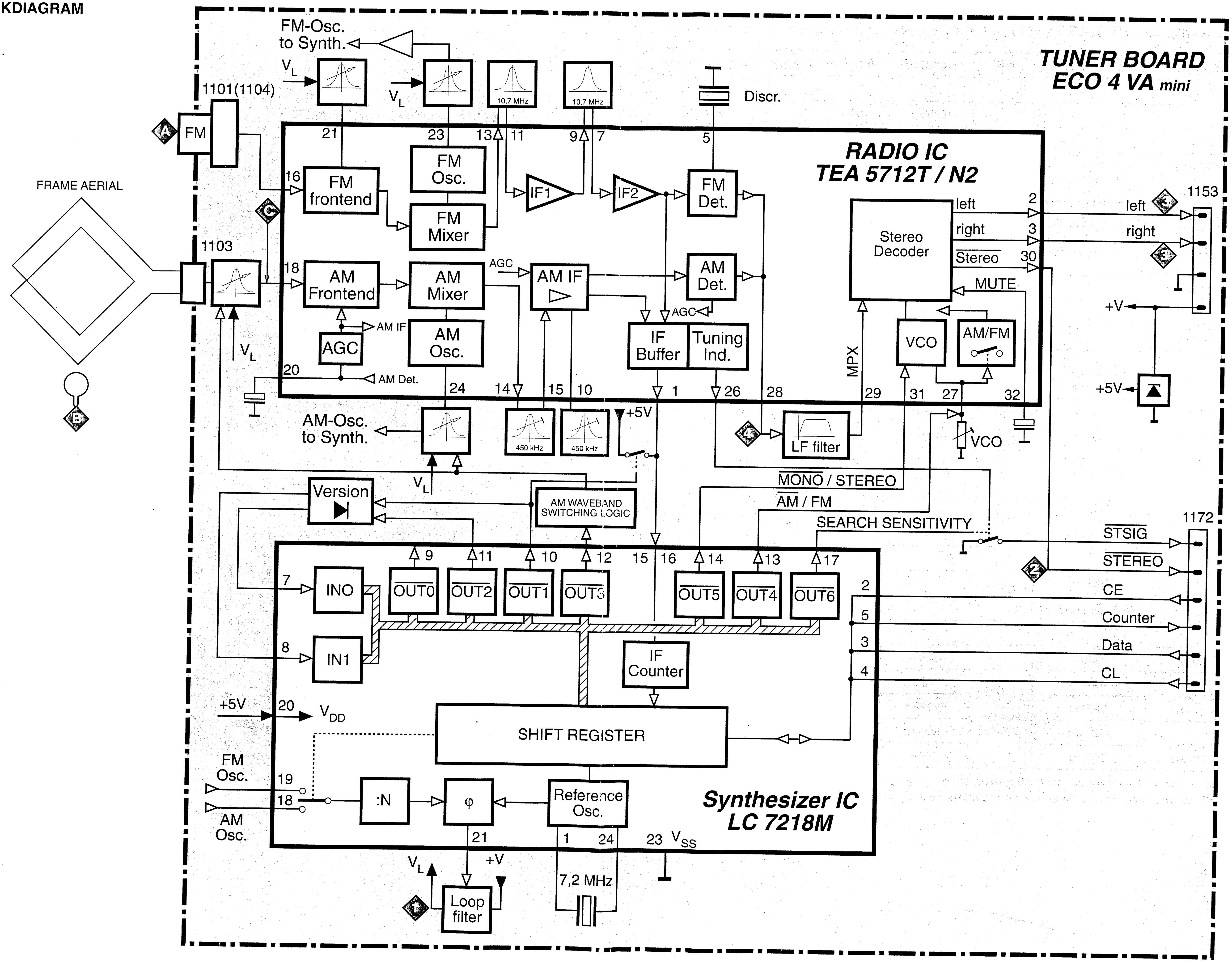
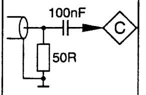
BLOCKDIAGRAM


TUNER BOARD
ECO 4 VA mini
RADIO IC
TEA 5712T / N2
Synthesizer IC
LC 7218M
FRAME AERIAL
1101(1104)
1103
1153
1172
FM
A
B
C
FM-Osc.
to Synth.
AM-Osc.
to Synth.
V_L
10,7 MHz
450 kHz
Discr.
FM frontend
FM Osc.
FM Mixer
IF1
IF2
FM Det.
AM Frontend
AM Mixer
AM Osc.
AGC
AM IF
AM Det.
IF Buffer
Tuning Ind.
Stereo Decoder
VCO
AM/FM
MUTE
MPX
LF filter
left
right
Stereo
+V
+5V
Version
AM WAVEBAND SWITCHING LOGIC
MONO / STEREO
AM / FM
SEARCH SENSITIVITY
STSIG
STEREO
CE
Counter
Data
CL
INO
IN1
OUT0
OUT2
OUT1
OUT3
OUT5
OUT4
OUT6
IF Counter
SHIFT REGISTER
V_DD
V_SS
FM Osc.
AM Osc.
:N
φ
Reference Osc.
7,2 MHz
Loop filter
1
2
3
4
5
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
23
24
26
27
28
29
30
31
32

TUNER ADJUSTMENT TABLE (**ECO4VA** FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM			108MHz	5120	◇1	8V ±0.2V
87.5 - 108MHz			87.5MHz	check		4.1V ±0.5V
FM East Europe			108MHz	5120		8V ±0.2V
65.81 - 108MHz			65.81MHz	check		0.8V ±0.4V
MW 2-band version			1710kHz	5123		9V ±0.1V
530 - 1710kHz			530kHz	check		1V ±0.4V
LW			279kHz	5122		8V ±0.2V
153 - 279kHz			153kHz	check		1V ±0.4V
MW 3-band version			1611kHz	5123		8V ±0.1V
522 - 1611kHz			522kHz	check		1V ±0.4V
FM RF						
FM	108MHz	◇A mod=1kHz Δf=22.5kHz	108MHz	2115	◇3	MAX
87.5 - 108MHz	87.5MHz		87.5MHz	5109		
FM East Europe	108MHz		108MHz	2115		
65.81 - 108MHz	65.81MHz		65.81MHz	5109		
VCO						
FM	98MHz, 1mV continuous wave	◇A	98MHz	3148	◇2	152kHz ±1kHz
AM IF						
MW	540kHz Δf=10kHz as low as possible		540kHz	5142 5140	◇4	symmetrical and max. height
AM RF 1)						
LW	198kHz	◇B mod=1kHz 30% AM	198kHz	5108	◇4	MAX
MW 3-band version	1494kHz		1494kHz	2113		MAX
522 - 1611kHz	549kHz		549kHz	5107		
MW 2-band version	1500kHz		1500kHz	2113		
530 - 1710kHz	550kHz		550kHz	5107		

ECO4VA mini.ai 290595

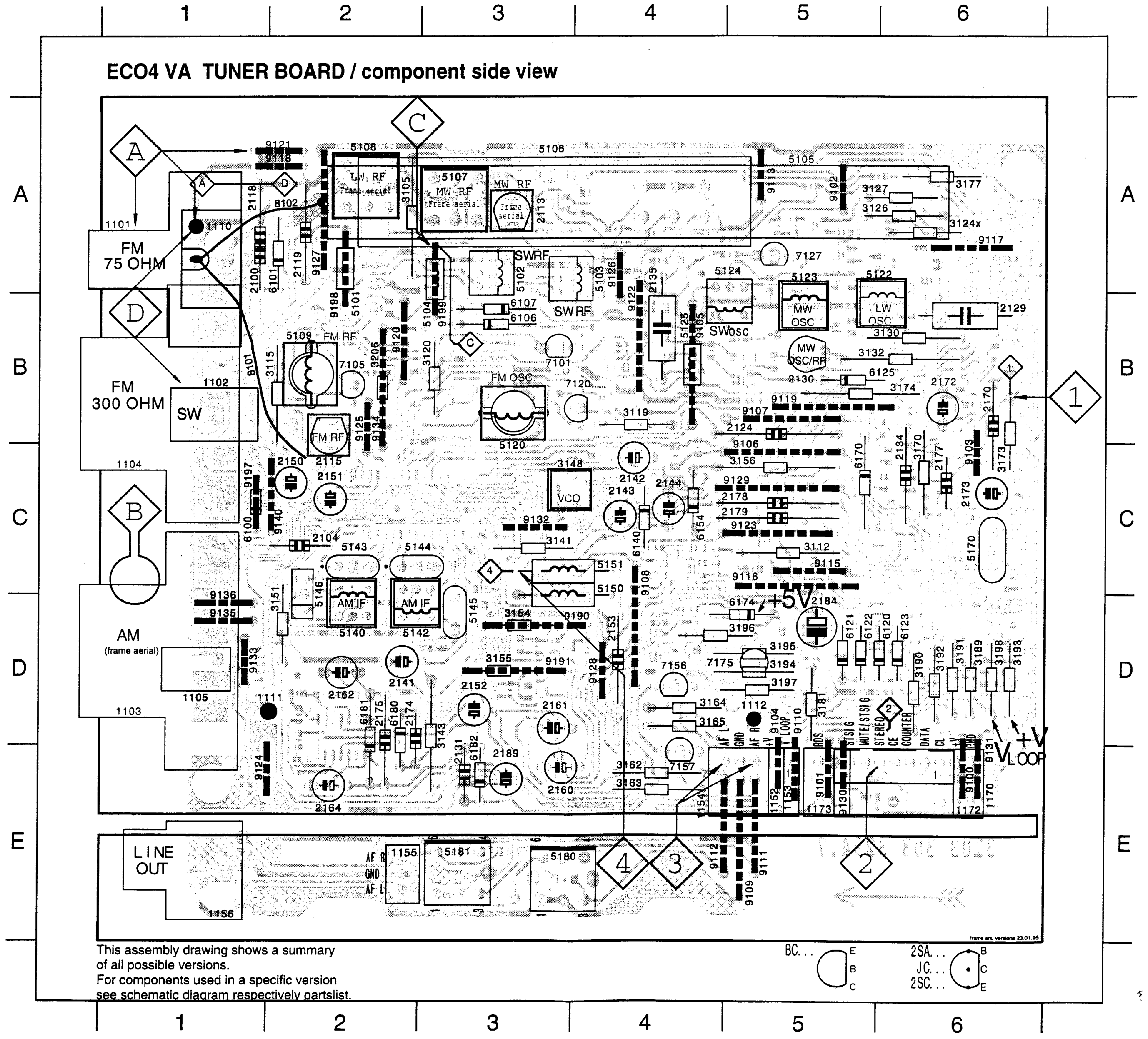
Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

1) For AM RF adjustments the original frame antenna 4822 158 60622 has to be used !

↕ Repeat

1101 A 1	1173 E 5	2142 C 4	2175 D 2	3127 A 6	3173 B 6	5101 A 2	5142 D 2	6121 D 5	7156 D 4	9110 E 5	9126 A 4	9198 A 2		
1102 B 1	2100 A 1	2143 C 4	2177 C 6	3130 B 6	3174 B 5	5102 A 3	5143 C 2	6122 D 5	7157 E 4	9111 E 5	9127 A 2	9199 A 3		
1103 D 1	2104 C 2	2144 C 4	2178 C 5	3132 B 6	3177 A 6	5103 A 3	5144 C 2	6123 D 6	7175 D 5	9112 E 4	9128 D 4			
1104 B 1	2106 B 4	2150 C 2	2179 C 5	3141 C 3	3181 D 5	5104 A 3	5145 D 3	6125 B 5	8101 B 1	9113 A 5	9129 C 5			
1105 D 1	2113 A 3	2151 C 2	2184 D 5	3143 D 3	3189 D 6	5105 A 4	5146 D 2	6140 C 4	8102 A 1	9115 C 5	9130 E 5			
1110 A 1	2115 B 2	2152 D 3	2189 E 3	3148 C 3	3190 D 6	5106 A 4	5150 D 3	6154 C 4	9100 E 6	9116 C 5	9131 E 6			
1111 D 2	2118 A 1	2153 D 4	2190 A 2	3151 D 2	3191 D 6	5107 A 3	5151 C 3	6170 C 5	9101 E 5	9117 A 6	9132 C 3			
1112 D 5	2119 A 2	2160 E 3	2191 A 6	3154 D 3	3192 D 6	5108 A 2	5170 C 6	6174 D 5	9102 A 5	9118 A 2	9133 D 1			
1152 E 5	2124 B 5	2161 D 3	3105 A 2	3155 D 3	3193 D 6	5109 B 2	5180 E 3	6180 D 2	9103 C 6	9119 B 5	9134 B 2			
1153 E 5	2129 B 6	2162 D 2	3112 C 5	3156 C 5	3194 D 5	5120 B 3	5181 E 3	6181 D 2	9104 E 5	9120 B 2	9135 D 1			
1154 E 4	2130 B 5	2164 E 2	3115 B 2	3162 E 4	3195 D 5	5122 B 6	6100 C 1	6182 E 3	9105 B 4	9121 A 2	9136 D 1	o	for AM-version only	
1155 E 2	2131 E 3	2170 B 6	3119 B 4	3163 E 4	3196 D 4	5123 B 5	6101 A 2	7101 B 3	9106 C 5	9122 B 4	9140 C 2	x	for LW-version only	
1156 E 1	2134 C 6	2172 B 6	3120 B 3	3164 D 4	3197 D 5	5124 B 5	6106 B 3	7105 B 2	9107 B 5	9123 C 5	9190 D 3	y	for USA version only	
1170 E 6	2135 B 4	2173 C 6	3124 A 6	3165 D 4	3198 D 6	5125 B 4	6107 B 3	7120 B 4	9108 D 4	9124 E 1	9191 D 3	z	not for all versions	
1172 E 6	2141 D 2	2174 D 2	3126 A 6	3170 C 6	3206 B 2	5140 D 2	6120 D 6	7127 A 5	9109 E 5	9125 B 2	9197 C 1			

ECO4 VA TUNER BOARD / component side view

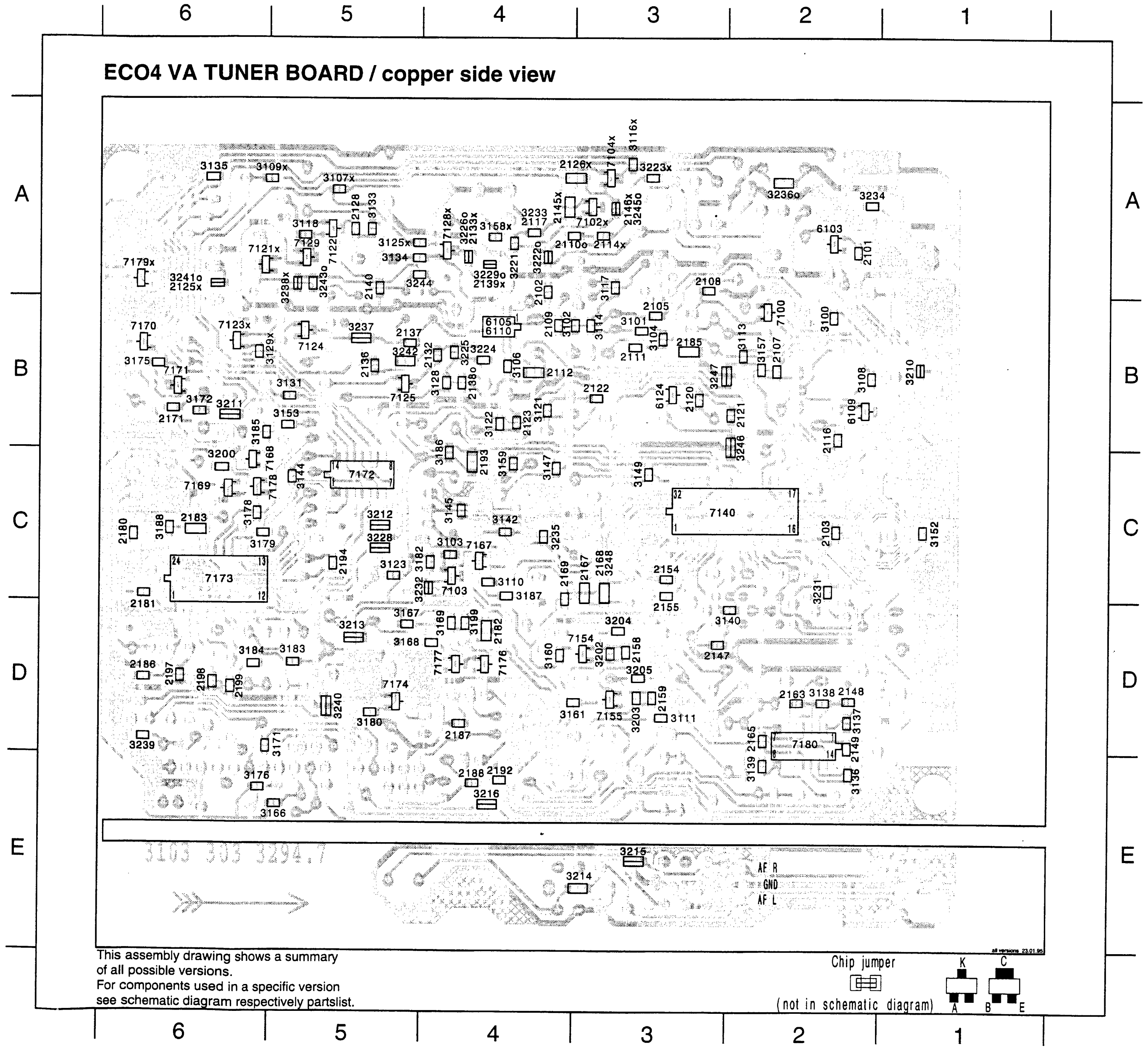

1
2
3
4
5
6
A
B
C
D
E
FM 75 OHM
FM 300 OHM
SW
AM (frame aerial)
LINE OUT
LW RF
MW RF
SWRF
SW RF
FM RF
FM OSC
VCO
AM IF
MW OSC
LW OSC
MW OSC/RF
SWosc
+5V
+V
V_{LOOP}
AF R
GND
AF L
1101
1102
1103
1104
1105
1110
1111
1112
1155
1156
1170
1172
1173
5105
5106
5107
5108
5109
5120
5122
5123
5124
5140
5142
5143
5144
5150
5151
5180
5181
frame ant. versions 23.01.95
BC...
E
B
C
2SA...
JC...
2SC...
B
C
E

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram respectively partslist.

2101 A 2	2122 B 3	2148 D 2	2183 C 6	3104 B 3	3125x A 5	3147 C 4	3175 B 6	3203 D 3	3226o A 4	3243o A 5	7121x A 6	7172 C 5
2102 A 4	2123 B 4	2149 D 2	2185 B 3	3106 B 4	3128 B 4	3149 C 3	3176 E 6	3204 D 3	3228 C 5	3244 A 5	7122 A 5	7173 C 6
2103 C 2	2125x A 6	2154 C 3	2186 D 6	3107x A 5	3129x B 6	3152 C 1	3178 C 6	3205 D 3	3229o A 4	3245o A 3	7123x B 6	7174 D 5
2105 B 3	2126x A 3	2155 C 3	2187 D 4	3108 B 2	3131 B 5	3153 B 5	3179 C 6	3210 B 1	3231 C 2	3246 B 2	7124 B 5	7176 D 4
2107 B 2	2128 A 5	2158 D 3	2188 E 4	3109x A 5	3133 A 5	3157 B 2	3180 D 5	3211 B 6	3232 C 4	3247 B 3	7125 B 5	7177 D 4
2108 A 3	2132 B 4	2159 D 3	2192 E 4	3110 C 4	3134 A 5	3158x A 4	3182 C 4	3212 C 5	3233 A 4	3248 C 3	7128x A 4	7178 C 6
2109 B 4	2133x A 4	2163 D 2	2193 C 4	3111 D 3	3135 A 6	3159 C 4	3183 D 5	3213 D 5	3234 A 2	6103 A 2	7129 A 5	7179x A 6
2110o A 4	2136 B 5	2165 E 2	2194 C 5	3113 B 2	3136 E 2	3160 D 4	3184 D 6	3214 E 3	3235 C 4	6105 B 4	7140 C 2	7180 D 2
2111 B 3	2137 B 5	2167 C 3	2197 D 6	3114 B 3	3137 D 2	3161 D 3	3185 B 6	3215 E 3	3236o A 2	6109 B 2	7154 D 3	
2112 B 4	2138o B 4	2168 C 3	2198 D 6	3116x A 3	3138 D 2	3166 E 5	3186 C 4	3216 E 4	3237 B 5	6110 B 4	7155 D 3	
2114x A 3	2139x A 4	2169 C 4	2199 D 6	3117 A 3	3139 D 2	3167 D 5	3187 C 4	3221 A 4	3238x A 5	6124 B 3	7167 C 4	
2116 B 2	2140 A 5	2171 B 6	3100 B 2	3118 A 5	3140 D 2	3168 D 4	3188 C 6	3222o A 4	3239 D 6	7100 B 2	7168 C 6	
2117 A 4	2145x A 4	2180 C 6	3101 B 3	3121 B 4	3142 C 4	3169 D 4	3199 D 4	3223x A 3	3240 D 5	7102x A 3	7169 C 6	
2120 B 3	2146x A 3	2181 C 6	3102 B 3	3122 B 4	3144 C 5	3171 D 6	3200 C 6	3224 B 4	3241o A 6	7103 C 4	7170 B 6	
2121 B 2	2147 D 3	2182 D 4	3103 C 4	3123 C 5	3145 C 4	3172 B 6	3202 D 3	3225 B 4	3242 B 5	7104x A 3	7171 B 6	

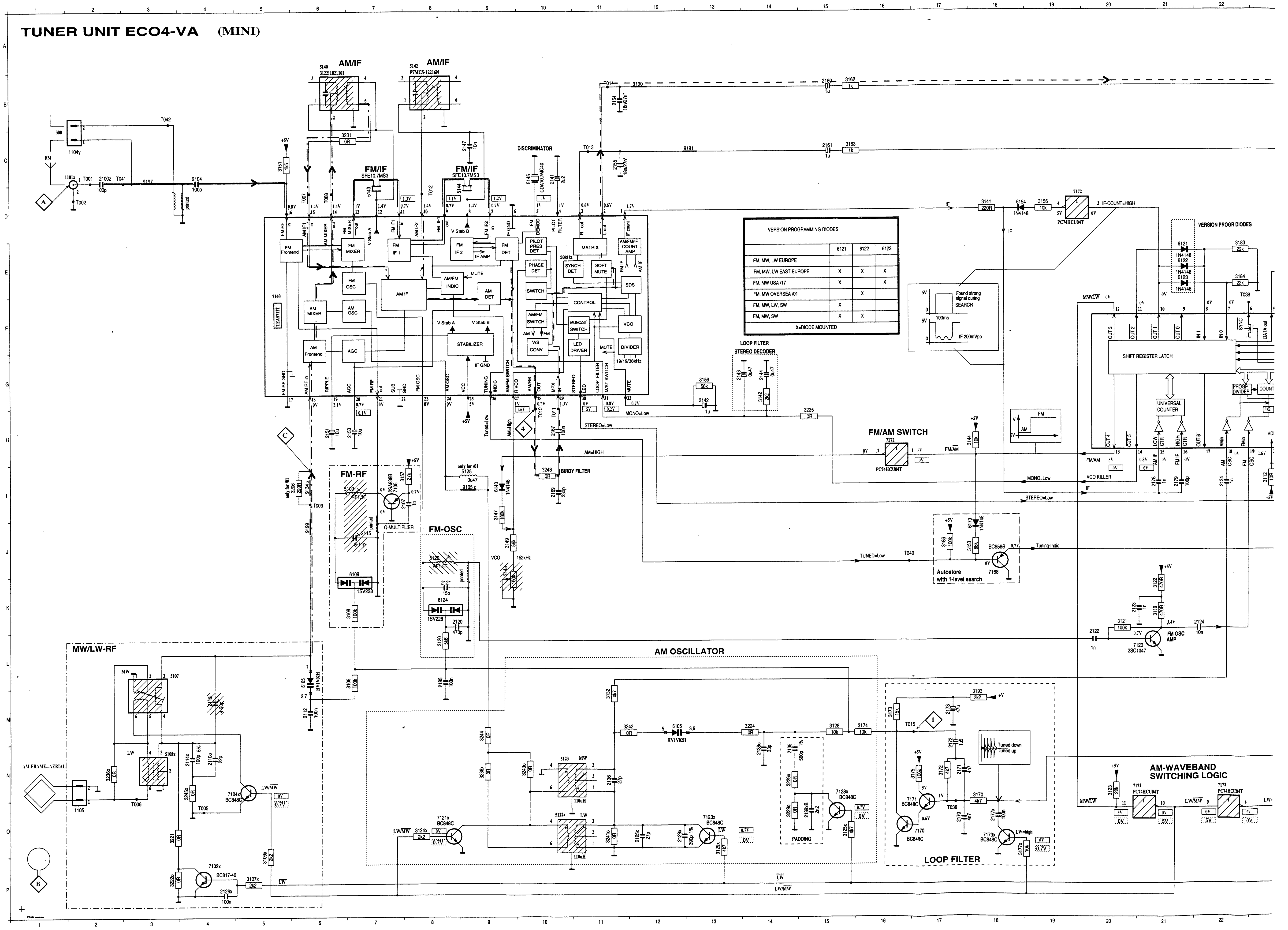
o for AM-version only
x for LW-version only
y for USA version only
z not for all versions

ECO4 VA TUNER BOARD / copper side view

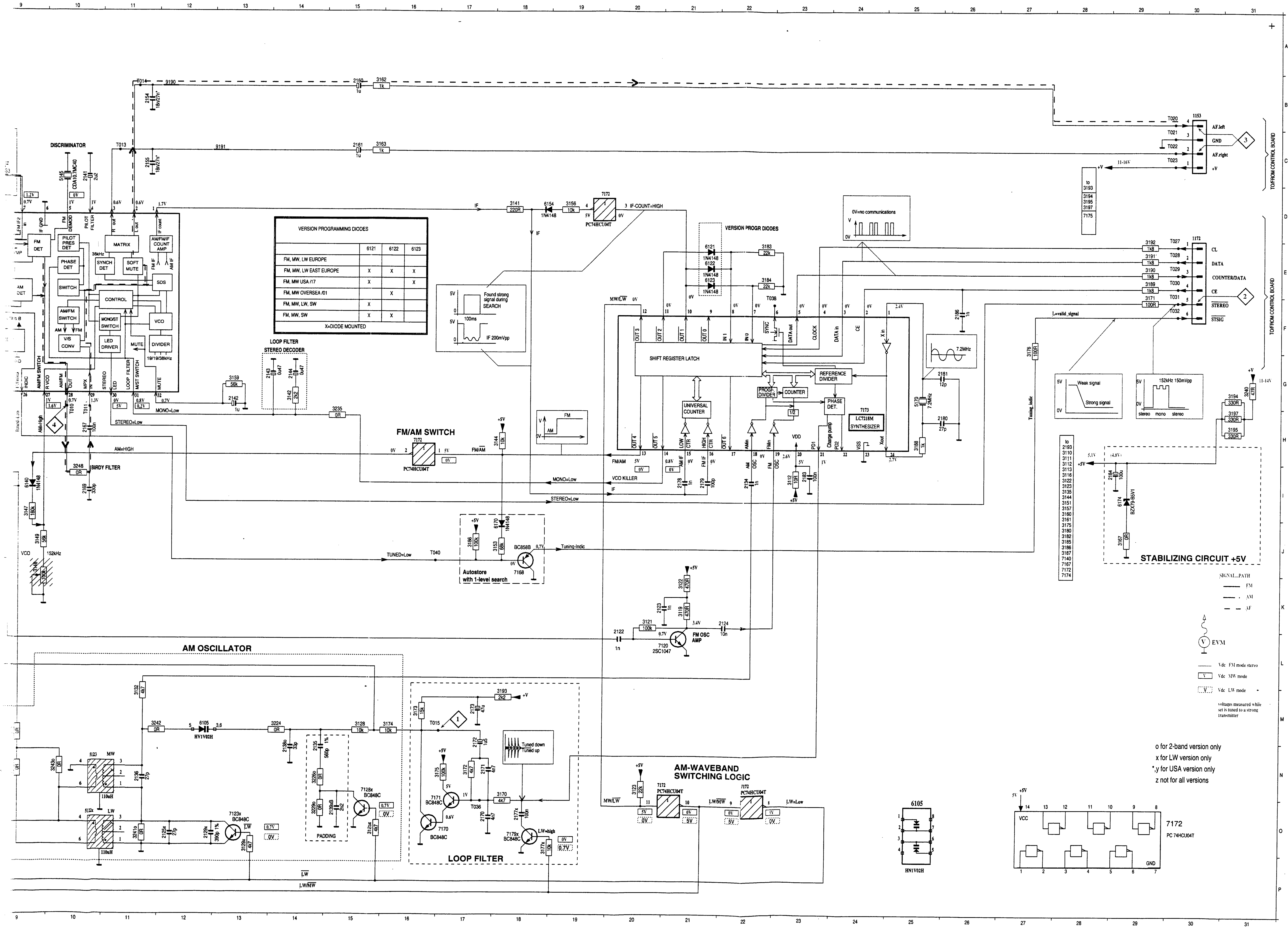


This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

TUNER UNIT ECO4-VA (MINI)


AM/IF
AM/IF
FM/IF
SFE10.7MS3
FM/IF
SFE10.7MS3
DISCRIMINATOR
FM Frontend
FM MIXER
FM IF 1
FM IF 2
IF AMP
FM DET
PILOT PRES DET
MATRIX
AM/FM/IF COUNT AMP
FM OSC
AM IF
AM/FM INDIC
MUTE
AM DET
PHASE DET
SYNCH DET
SOFT MUTE
SDS
SWITCH
CONTROL
AM MIXER
AM OSC
AM/FM SWITCH
MONOST SWITCH
VCO
V Stab A
V Stab B
STABILIZER
AM Frontend
AGC
V/S CONV
LED DRIVER
MUTE
DIVIDER
19/19/38kHz
TEA5711T
7140
LOOP FILTER
STEREO DECODER
Found strong signal during SEARCH
100ms
IF 200mVpp
IF-COUNT=HIGH
PC74HCU04T
VERSION PROGR DIODES
SHIFT REGISTER LATCH
UNIVERSAL COUNTER
PROGR DIVIDER
FM/AM SWITCH
MONO=Low
STEREO=Low
TUNED=Low
BIRDY FILTER
FM-RF
Q-MULTIPLIER
FM-OSC
Autostore with 1-level search
BC858B
FM OSC AMP
2SC1047
MW/LW-RF
AM-FRAME...AERIAL
AM OSCILLATOR
PADDING
LOOP FILTER
Tuned down
Tuned up
AM-WAVEBAND SWITCHING LOGIC
LW/MW
MW/LW
AM=HIGH
LW=high

VERSION PROGRAMMING DIODES			
	6121	6122	6123
FM, MW, LW EUROPE			
FM, MW, LW EAST EUROPE	X	X	X
FM, MW USA /17	X		X
FM, MW OVERSEA /01		X	
FM, MW, LW, SW	X		
FM, MW, SW	X	X	
X=DIODE MOUNTED			


DISCRIMINATOR
5145 CDA10.7MC40
FM DET
PILOT PRES DET
PHASE DET
SYNCH DET
SOFT MUTE
MATRIX
AM/FM/IF COUNT AMP
SDS
SWITCH
CONTROL
AM/FM SWITCH
MONOST SWITCH
VCO
V/S CONV
LED DRIVER
MUTE
DIVIDER
19/19/38kHz
38kHz
AM DET
AM/FM SWITCH
R VCO
MPX
LED
LOOP FILTER
MST SWITCH
BIRDY FILTER
AM=HIGH
STEREO=Low
MONO=Low
VCO
152kHz
LOOP FILTER STEREO DECODER
9190
9191
T013
T014
IF
IF-COUNT=HIGH
7172 PC74HCU04T
Found strong signal during SEARCH
100ms
IF 200mVpp
FM/AM SWITCH
VERSION PROGR DIODES
0V=no communications
SHIFT REGISTER LATCH
UNIVERSAL COUNTER
PROGR. DIVIDER
COUNTER
REFERENCE DIVIDER
PHASE DET.
7173 LC7218M SYNTHESIZER
OUT 3
OUT 2
OUT 1
OUT 0
IN 1
IN 0
SYNC
DATA out
CLOCK
DATA in
CE
X in
X out
VDD
PD1
PD2
Charge pump
VSS
AMin
FMin
AM OSC
FM OSC
7.2MHz
Tuning_indic
L=valid_signal
Weak signal
Strong signal
152kHz 150mVpp
stereo mono stereo
MW/LW
FM/AM
VCO KILLER
TUNED=Low
T040
Autostore with 1-level search
BC858B
7168
FM OSC AMP
7120 2SC1047
TO/FROM CONTROL BOARD
1153
AF.left
GND
AF.right
+V
11-16V
1172
CL
DATA
COUNTER/DATA
CE
STEREO
STSIG
11-14V
STABILIZING CIRCUIT +5V
BZX79-B5V1
AM OSCILLATOR
5123 MW 110uH
5122x LW 110uH
6105 HV1V02H
7123x BC848C
7128x BC848C
PADDING
LOOP FILTER
Tuned down
Tuned up
7171 BC848C
7170 BC848C
7179x BC848C
LW=high
AM-WAVEBAND SWITCHING LOGIC
LW=Low
LW
LW/MW
6105
HN1V02H
7172
PC 74HCU04T
VCC
GND

VERSION PROGRAMMING DIODES	6121	6122	6123
FM, MW, LW EUROPE			
FM, MW, LW EAST EUROPE	X	X	X
FM, MW USA /17	X		X
FM, MW OVERSEA /01		X	
FM, MW, LW, SW	X		
FM, MW, SW	X	X	

X=DIODE MOUNTED

SIGNAL...PATH

— FM

—. AM

– – AF

EVM

Vdc FM mode stereo

Vdc MW mode

Vdc LW mode

voltages measured while set is tuned to a strong transmitter

o for 2-band version only

x for LW version only

*,y for USA version only

z not for all versions

1101z	C 1
1104y	C 2
1105	O 2
1153	B30
1172	D30
2100z	C 2
2104	C 4
2107	I 8
2110o	N 4
2112	N 6
2113	M 4
2114x	N 4
2115	J 7
2120	K 8
2121	K 8
2122	K20
2123	K20
2124	K22
2125x	O12
2126x	P 4
2129x	O12
2134	I22
2135	N14
2136	N11
2138o	N14
2139x	O15
2141	C10
2142	G13
2143	G13
2144	G14
2147	C 9
2150	H 7
2151	H 6
2154	C11
2155	C12
2160	B15
2161	C15
2167	H10
2169	I10
2170	O17
2171	N17
2172	M17
2173	M17
2177x	O18
2178	I21
2179	I21
2180	H25
2181	G25
2183	I23
2184	I29
2185	L 8
2186	F26
3106	L 7
3107x	P 5
3108	K 7
3109x	O 5
3112	I23
3119	K21
3120	L 8
3121	K20
3122	K21
3123	N20
3124x	O 8
3125x	O15
3128	M15
3129x	O13
3132	M12
3141	D18
3142	G14
3144	H18
3147	I 9
3148	J 9
3149	J 9
3151	C 4
3153	J18
3156	D19
3157	I 7
3159	G13
3162	B15
3163	C15
3167	J29
3170	N18
3171	F29
3172	N17
3173	M16
3174	M16
3175	N17
3176	F27
3177x	O18
3183	E22
3184	E22
3186	J17
3188	H25
3189	E29
3190	E29
3191	E29
3192	E29
3193	M18
3194	G31
3195	H31
3197	H31
3206	I 6
3221	O 3
3222o	P 3
3224	M14
3226o	N14
3229o	O14
3231	C 7
3235	H15
3236o	N 2
3238x	N 9
3240	G31
3241o	O11
3242	N11
3243o	N10
3244	M 9
3245o	N 4
3248	I10
5107	M 2
5108x	N 3
5109	I 7
5120	J 8
5122x	O10
5123	N10
5125	I 9
5140	A 6
5142	A 8
5143	D 7
5144	D 9
5145	C10
5170	G25
6105	M12
6105	N6
6109	J 7
6121	E21
6122	E21
6123	E21
6124	K 8
6140	I 9
6154	D18
6170	J18
6174	I29
7102x	P 4
7104x	N 5
7105	I 7
7120	L20
7121x	O 8
7123x	O13
7128x	N15
7140	E 5
7168	J18
7170	O17
7171	O17
7172	H16
7172	D20
7172	O20
7172	N22
7172	N20
7172	O22
7173	H24
7179x	O18
9105	I 9
9134	I 6
9190	B12
9191	C13
9197	C 3
9199	J 6

T001	C 2
T002	D 2
T005	O 4
T006	O 3
T007	D 6
T008	D 6
T009	I 6
T010	H10
T011	H10
T012	C 8
T013	C11
T014	B11
T015	M16
T020	B29
T021	C29
T022	C29
T023	C29
T027	D30
T028	E30
T029	E30
T030	E30
T031	E30
T032	F30
T033	F30
T036	O17
T038	F22
T040	J13
T041	C 2
T042	B 3

Remarks

ELECTRICAL PARTSLIST TUNER ECO4VA BOARD

MISCELLANEOUS

1101	4822 267 10283	SOCKET COAX IEC 75R
1105	4822 265 31184	JST CONNECTOR 2 POLE

DIODES

6105	4822 130 83075	HN1V02H
6109	4822 130 82833	1SV228
6122	4822 130 30621	1N4148
6124	4822 130 82833	1SV228
6140	4822 130 30621	1N4148
6154	4822 130 30621	1N4148
6170	4822 130 30621	1N4148
6174	4822 130 34233	BZX79-B5V1

TRANSISTORS

7105	4822 130 60093	2SA838B
7120	4822 130 60163	2SC1047
7168	5322 130 41983	BC858B(CHIP)
7170	5322 130 42136	BC848C(CHIP)
7171	5322 130 42136	BC848C(CHIP)

INTEGRATED CIRCUITS

7140	4822 209 32701	TEA5712T/N2 (RF IC)
7172	5322 209 11517	PC74HCU04T
7173	4822 209 31998	LC7218M SYNTHESIZER

COILS

5107	4822 157 63835	ANT. COIL MW 2-BAND
5109	4822 156 30947	RF COIL 1,5 TURNS
5120	4822 156 30947	RF COIL 1,5 TURNS
5123	4822 157 60517	110µH 8%
5125	4822 157 61898	0,47µH
5140	4822 158 60511	AM-IF FILTER 450kHz
5142	4822 157 70302	AM-IF FILTER 450kHz
5143	4822 242 70665	CER. FILTER 10,7MHZ
5144	4822 242 70665	CER. FILTER 10,7MHZ
5145	4822 242 81362	CER. DISCRIMINATOR
5170	4822 242 72976	CER.RESONATOR 7,2MHz

RESISTORS

3112	4822 116 52176	10R	5%	0,5W
3119	4822 116 52224	470R	5%	0,5W
3120	4822 116 52289	5k6	5%	0,16W
3132	4822 116 52283	4k7	5%	0,5W
3141	4822 116 52215	220R	5%	0,16W
3148	4822 100 11163	TRIMPOT.100k lin.		
3151	4822 116 52243	1k5	5%	0,16W
3156	4822 116 83864	10k	5%	0,5W
3162	4822 050 11002	1k	5%	0,2W
3163	4822 050 11002	1k	5%	0,2W
3170	4822 116 52283	4k7	5%	0,5W
3173	4822 116 52244	15k	5%	0,5W
3174	4822 116 83864	10k	5%	0,5W
3189	4822 116 52249	1k8	5%	0,16W
3190	4822 116 52249	1k8	5%	0,16W
3191	4822 116 52249	1k8	5%	0,16W
3192	4822 116 52249	1k8	5%	0,16W
3193	4822 116 52256	2k2	5%	0,16W
3194	4822 116 52219	330R	5%	0,5W
3195	4822 116 52219	330R	5%	0,5W
3197	4822 116 52219	330R	5%	0,5W
3206	4822 116 52215	220R	5%	0,16W

CHIP RESISTORS

3106	4822 051 20104	100k	5%	0,1W
3108	4822 051 20104	100k	5%	0,1W
3121	4822 051 20104	100k	5%	0,1W
3122	4822 051 20471	470R	5%	0,1W
3123	4822 051 20223	22k	5%	0,1W
3128	4822 117 10833	10k	1%	0,1W
3142	4822 051 20222	2k2	5%	0,1W
3144	4822 117 10833	10k	1%	0,1W
3147	4822 051 20184	180k	5%	0,1W
3149	4822 051 20563	56k	5%	0,1W
3153	4822 051 20683	68k	5%	0,1W
3157	4822 051 20273	27k	5%	0,1W
3159	4822 051 20563	56k	5%	0,1W
3167	4822 051 20008	CHIP JUMPER 0805		
3171	4822 051 20101	100R	5%	0,1W
3172	4822 051 20472	4k7	5%	0,1W
3175	4822 051 20104	100k	5%	0,1W
3176	4822 051 20101	100R	5%	0,1W
3183	4822 051 20223	22k	5%	0,1W
3184	4822 051 20223	22k	5%	0,1W
3186	4822 051 20104	100k	5%	0,1W
3188	4822 051 10102	1k	2%	0,25W
3210	4822 051 20008	CHIP JUMPER 0805		
3211	4822 051 10008	CHIP JUMPER1206		
3212	4822 051 10008	CHIP JUMPER1206		
3213	4822 051 10008	CHIP JUMPER1206		
3221	4822 051 20008	CHIP JUMPER 0805		
3222	4822 051 20008	CHIP JUMPER 0805		
3224	4822 051 20008	CHIP JUMPER 0805		
3226	4822 051 20008	CHIP JUMPER 0805		
3228	4822 051 10008	CHIP JUMPER1206		
3229	4822 051 20008	CHIP JUMPER 0805		
3231	4822 051 20008	CHIP JUMPER 0805		
3235	4822 051 20008	CHIP JUMPER 0805		
3236	4822 051 10008	CHIP JUMPER1206		
3237	4822 051 10008	CHIP JUMPER1206		
3240	4822 051 10479	47R		
3241	4822 051 20008	CHIP JUMPER 0805		
3242	4822 051 10008	CHIP JUMPER1206		
3243	4822 051 20008	CHIP JUMPER 0805		
3244	4822 051 20008	CHIP JUMPER 0805		
3246	4822 051 10008	CHIP JUMPER1206		
3247	4822 051 10008	CHIP JUMPER1206		
3248	4822 051 10008	CHIP JUMPER1206		

CAPACITORS

2100	4822 122 33195	100pF	10%	50V
2104	4822 122 33195	100pF	10%	50V
2113	4822 125 50355	4,2-20pF VARIABLE		
2115	4822 125 60101	10pF VARIABLE		
2124	4822 121 51387	10nF	20%	16V
2134	4822 122 33197	1nF	10%	50V
2135	4822 121 70245	560pF	1%	160V
2141	4822 124 40244	2,2µF	20%	63V
2142	4822 124 40242	1µF	20%	63V
2143	4822 124 40239	0,47µF	20%	63V

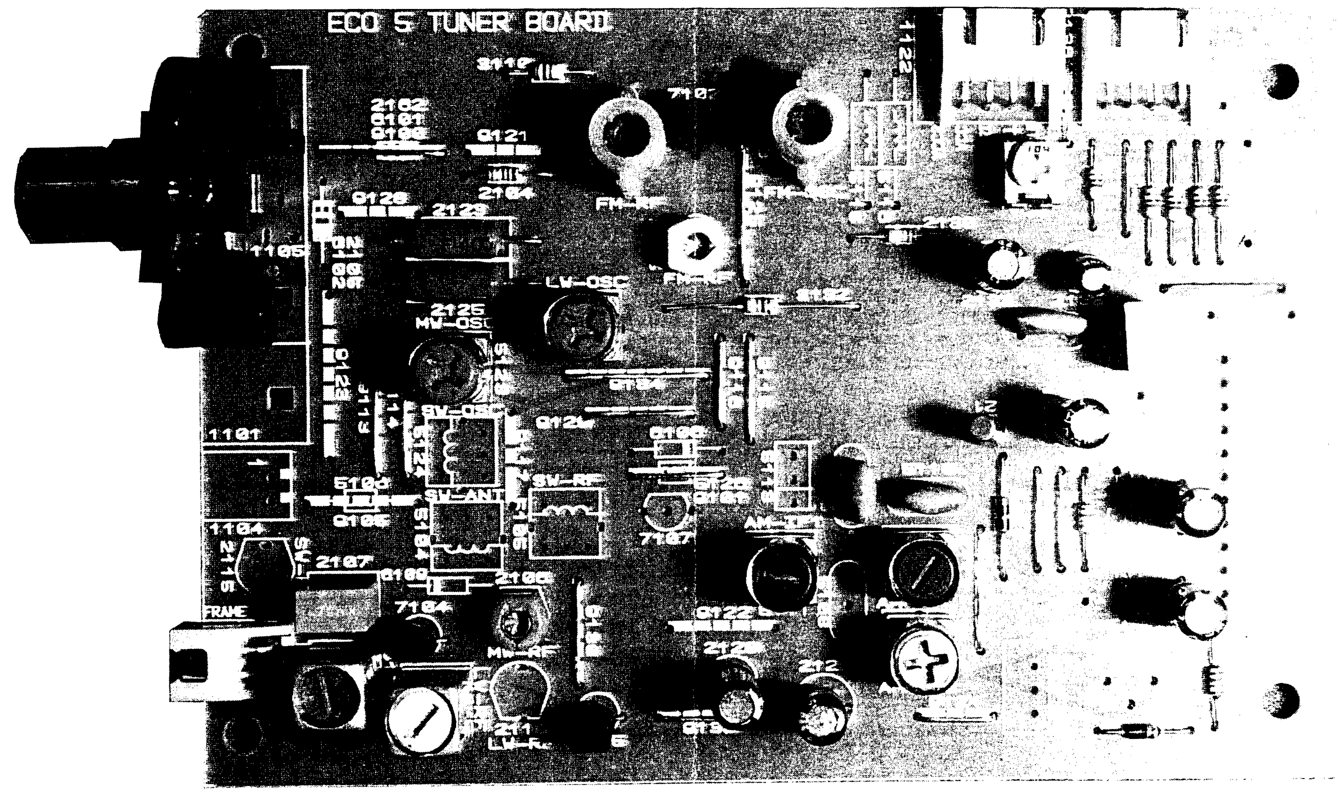
ELECTRICAL PARTSLIST TUNER ECO4VA BOARD

CAPACITORS

2144	4822 124 40239	0,47µF	20%	63V
2150	4822 124 40248	10µF	20%	63V
2151	4822 124 40248	10µF	20%	63V
2160	4822 124 40242	1µF	20%	63V
2161	4822 124 40242	1µF	20%	63V
2170	4822 126 11714	4,7nF	20%	
2172	4822 124 41631	1,5µF	20%	50V
2173	4822 124 40433	47µF	20%	25V
2178	4822 122 33197	1nF	10%	50V
2179	4822 122 33195	100pF	10%	50V
2184	4822 124 41584	100µF	20%	10V

CHIP CAPACITORS

2107	5322 122 34123	1nF	10%	50V
2112	4822 122 33496	100nF	10%	63V
2120	5322 122 32268	470pF	10%	50V
2121	5322 122 32481	15pF	5%	50V
2122	5322 122 34123	1nF	10%	50V
2123	5322 122 34123	1nF	10%	50V
2136	5322 122 31946	27pF	5%	50V
2138	5322 122 32659	33pF	5%	50V
2147	4822 122 33177	10nF	20%	50V
2154	4822 122 33893	18nF	10%	63V
2155	4822 122 33893	18nF	10%	63V
2167	4822 122 33496	100nF	10%	63V
2169	5322 122 31863	330pF	5%	50V
2171	5322 126 10223	4,7nF	10%	63V
2180	5322 122 31946	27pF	5%	50V
2181	4822 122 32139	12pF	5%	63V
2183	4822 122 33496	100nF	10%	63V
2185	4822 122 33496	100nF	10%	63V
2186	5322 122 34123	1nF	10%	50V


ECO 5 TUNER BOARD

TUNER BOARD ECO5

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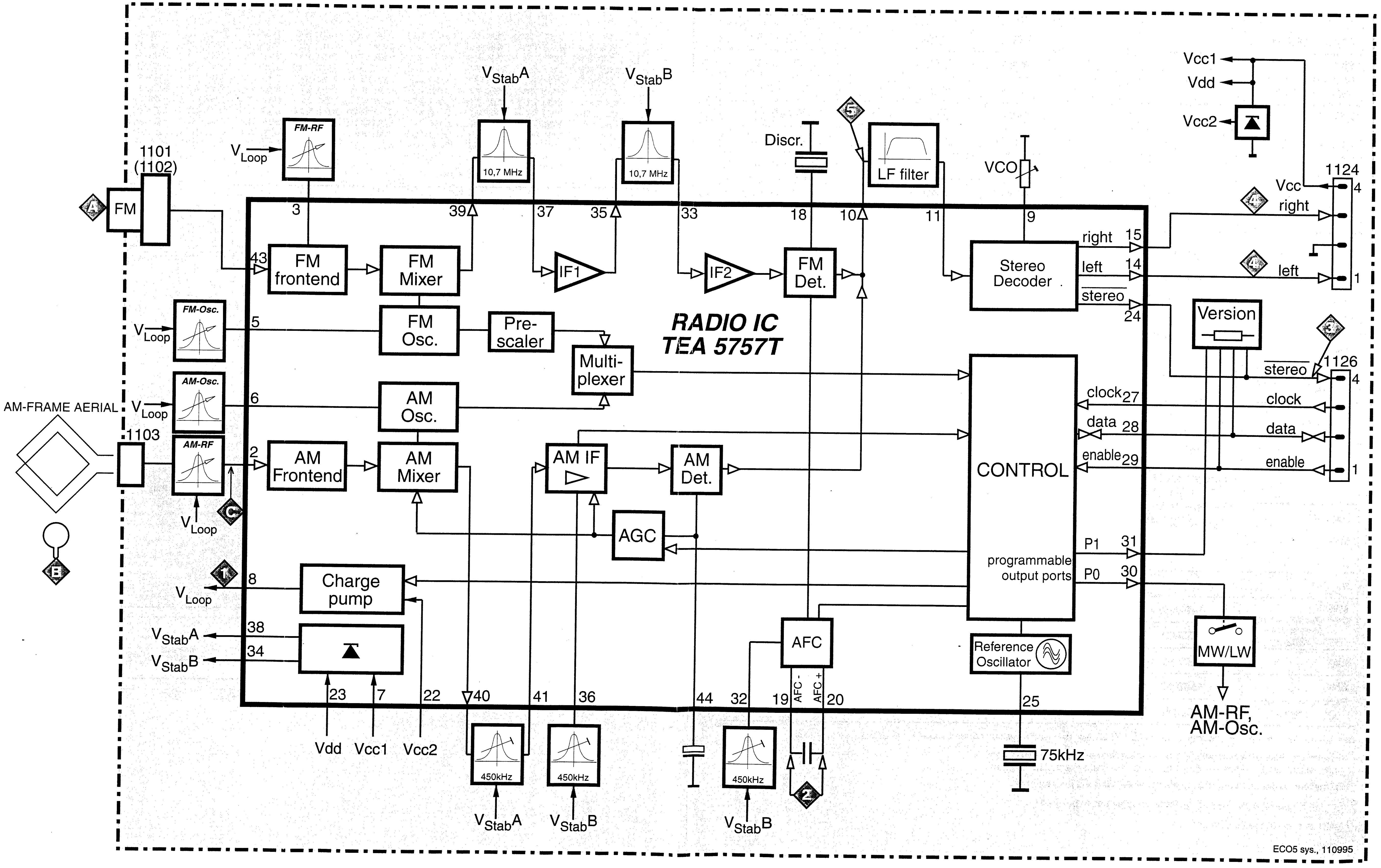
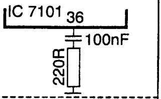
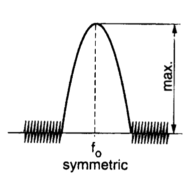
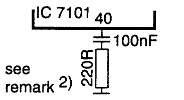
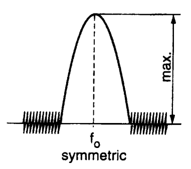
Circuit diagram 7B-3
Partslist 7B-4

BLOCKDIAGRAM

TUNER BOARD
ECO 5 systems


FM-RF
V Loop
VStabA
VStabB
10,7 MHz
10,7 MHz
Discr.
5
LF filter
VCO
Vcc1
Vdd
Vcc2
1124
Vcc
4
right
left
1
1101
(1102)
A
FM
3
39
37
35
33
18
10
11
9
43
FM frontend
FM Mixer
IF1
IF2
FM Det.
Stereo Decoder
right 15
left 14
stereo 24
FM-Osc.
5
FM Osc.
Pre-scaler
Multi-plexer
RADIO IC
TEA 5757T
Version
3
stereo
1126
AM-Osc.
6
AM Osc.
clock 27
data 28
enable 29
clock
data
enable
AM-FRAME AERIAL
1103
AM-RF
2
AM Frontend
AM Mixer
AM IF
AM Det.
CONTROL
C
B
AGC
P1 31
programmable output ports
P0 30
1
8
Charge pump
38
34
23
7
22
40
41
36
44
32
19
AFC -
AFC +
20
AFC
Reference Oscillator
25
MW/LW
AM-RF, AM-Osc.
Vdd
Vcc1
Vcc2
450kHz
450kHz
450kHz
2
75kHz
ECO5 sys., 110995

TUNER ADJUSTMENT TABLE (ECO5 FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz			108MHz	5130	◇1	8V ±0.2V
			87.5MHz	check		4.3V ±0.5V
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM RF						
FM 87.5 - 108MHz	108MHz	◇A mod=1kHz Δf=±22.5kHz	108MHz	2155	◇4	MAX
	87.5MHz		87.5MHz	5131		
VCO						
FM	98MHz, 1mV continuous wave	◇A	98MHz	3142	◇3	152kHz ±1kHz 1)
AM IF						
MW	450kHz connect pin 26 of IC 7101 (AM Osc.) with short wire to ground (pin 4)	◇C Δf=±15kHz V_{RF} = 3mV	 IC 7101 36 100nF 220R	5111	◇4	 max. f_o symmetric
			 IC 7101 40 100nF 220R see remark 2)	5112		
AM AFC **MW**		◇C continuous wave V_{RF} = 10mV		5114	◇2	0 ± 2 mV DC
AM RF 3)						
MW 4) FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	◇B Δf = ±30kHz V_{RF} as low as possible	1494kHz	2106	◇4	 max. f_o symmetric
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz		1500kHz	2106		
	560kHz		560kHz	5102		

ECO5. 020995

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

1) If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

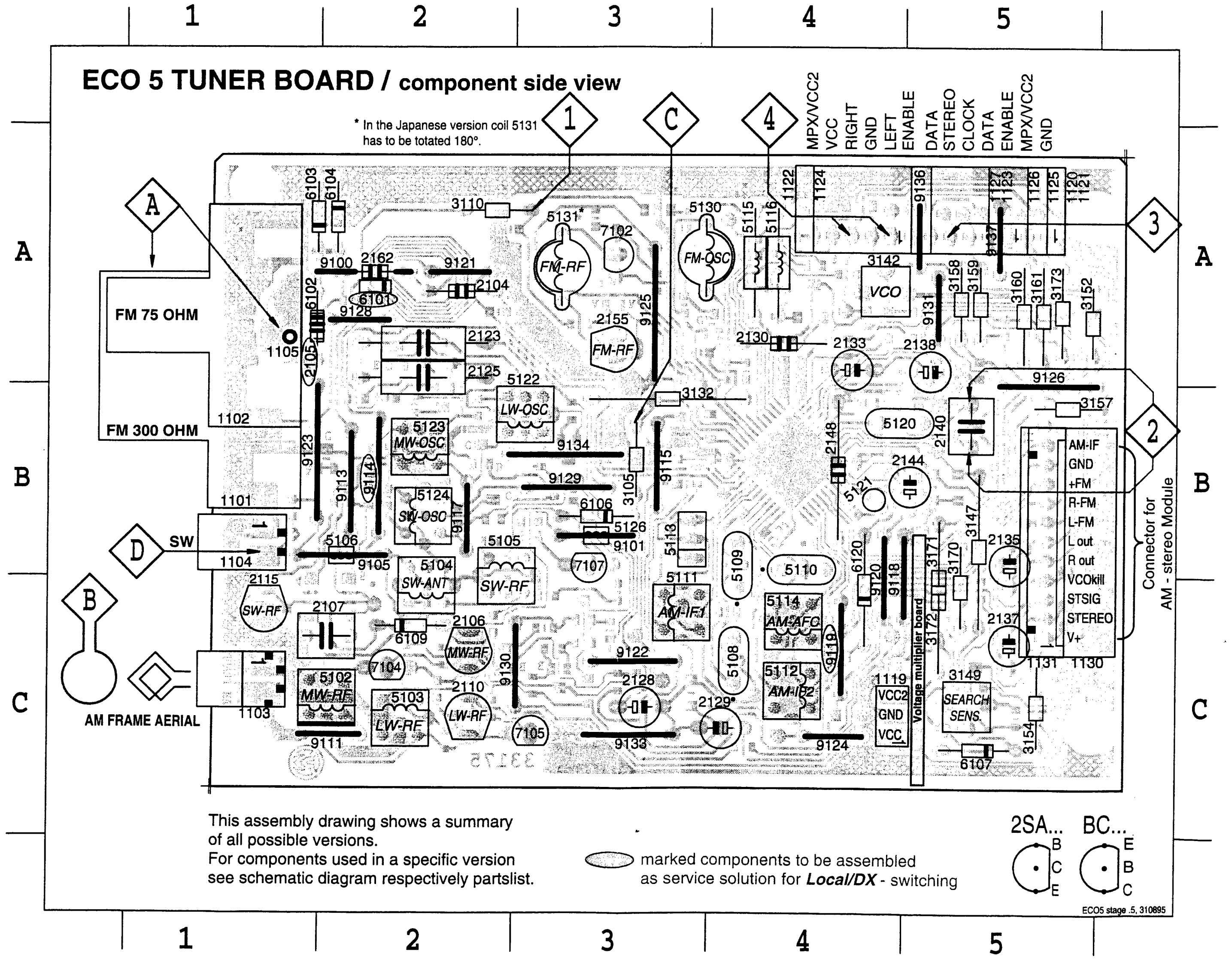
2) RC network serves for damping the IF-filter while adjusting the other one.

3) For AM RF adjustments the original frame antenna has to be used !

4) MW has to be aligned before LW.

↕ Repeat

1101	A1
1102	A1
1103	C1
1104	B1
1105	A1
1119	C5
1120	A5
1130	B5
1131	B5
2104	A2
2105	A1
2106	C2
2107	C2
2110	C2
2115	C1
2123	A2
2125	A2
2128	C3
2129	C4
2130	A4
2133	A4
2135	B5
2137	C5
2138	A5
2140	B5
2144	B5
2148	B4
2155	A3
2162	A2
3105	B3
3110	A2
3132	B3
3142	A4
3147	B5
3149	C5
3152	A5
3154	C5
3157	B5
3158	A5
3159	A5
3160	A5
3161	A5
3170	C5
3171	C5
3172	C5
3173	A5
5102	C2
5103	C2
5104	C2
5105	B2
5106	B2
5108	C4
5109	B4
5110	B4
5111	C3
5112	C4
5113	B3
5114	C4
5115	A4
5116	A4
5120	B4
5121	B4
5122	B3
5123	B2
5124	B2
5126	B3
5130	A3
5131	A3
6101	A2
6102	A1
6103	A1
6104	A2
6106	B3
6107	C5
6109	C2
6120	C4
7102	A3
7104	C2
7105	C3
7107	B3
9100	A2
9101	B3
9105	B2
9111	C2
9113	B2
9114	B2
9115	B3
9117	B2
9118	B4
9119	C4
9120	B4
9121	A2
9122	C3
9123	B1
9124	C4
9125	A3
9126	B5
9128	A2
9129	B3
9130	C3
9131	A5
9133	C3
9134	B3
9136	A5
9137	A5


1
2
3
4
5
A
B
C
MPX/VCC2
VCC
RIGHT
GND
LEFT
ENABLE
DATA
STEREO
CLOCK
DATA
ENABLE
MPX/VCC2
GND
FM 75 OHM
FM 300 OHM
SW
AM FRAME AERIAL
FM-RF
FM-OSC
VCO
LW-OSC
MW-OSC
SW-OSC
SW-ANT
SW-RF
AM-IF1
AM-AFC
AM-IF2
MW-RF
LW-RF
SEARCH SENS.
Voltage multiplier board
AM-IF
GND
+FM
R-FM
L-FM
L out
R out
VCOkill
STSIG
STEREO
V+
Connector for AM - stereo Module
2SA...
BC...
B
C
E
ECO5 stage .5. 310895

ECO 5 TUNER BOARD / component side view

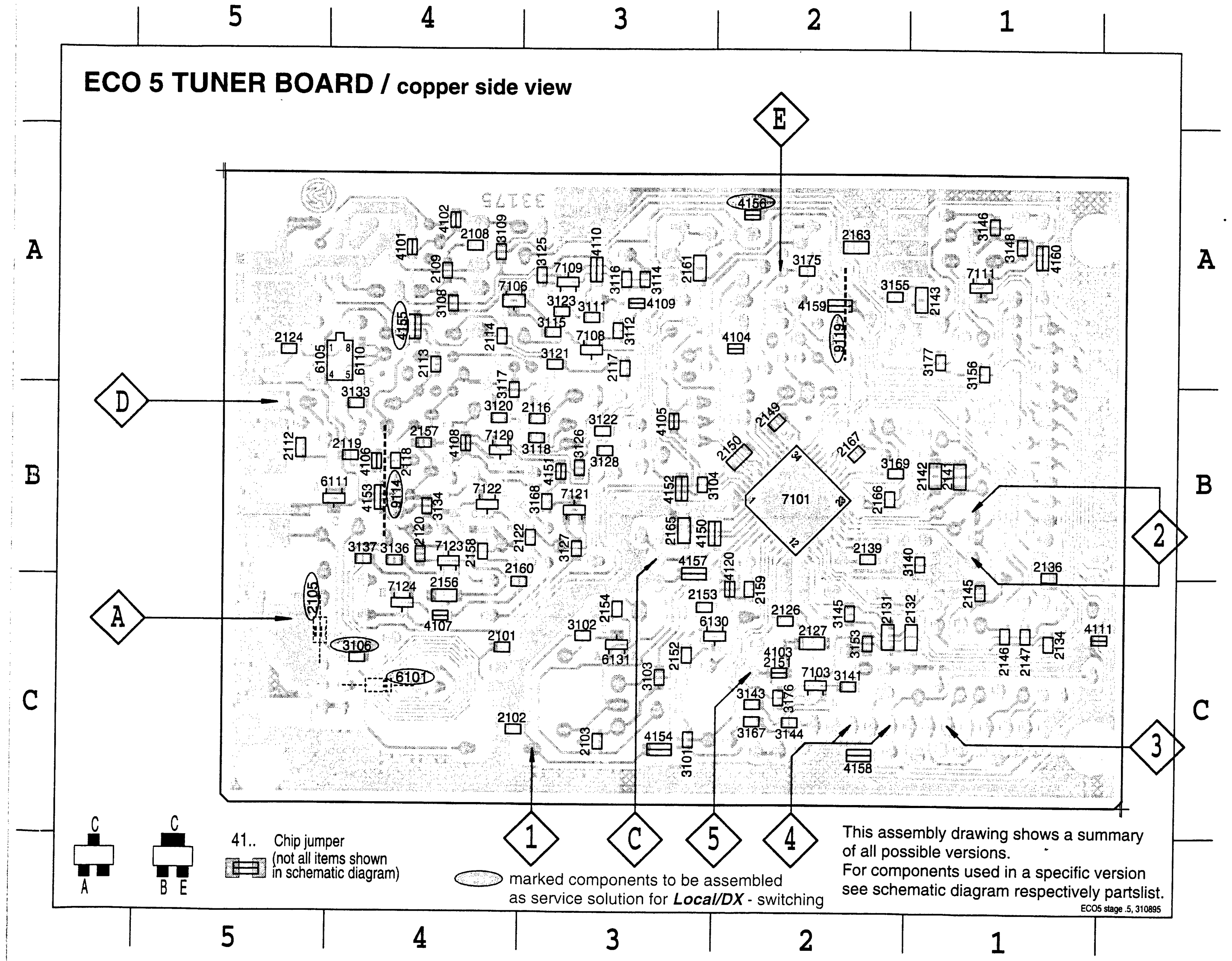
* In the Japanese version coil 5131 has to totated 180°.

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

⬭ marked components to be assembled as service solution for *Local/DX* - switching

2101	C4	2119	B4	2141	B1	2154	C3	3101	C3	3116	A3	3133	B4	3153	C2	4103	C2	4151	B3	6110	A4	7121	B3		
2102	C4	2120	B4	2142	B1	2156	C4	3102	C3	3117	B4	3134	B4	3155	A2	4104	A2	4152	B3	6111	B4	7122	B4		
2103	C3	2122	B3	2143	A1	2157	B4	3103	C3	3118	B3	3136	B4	3156	A1	4105	B3	4153	B4	6130	C2	7123	B4		
2108	A4	2124	A5	2145	C1	2158	B4	3104	B3	3120	B4	3137	B4	3167	C2	4106	B4	4154	C3	6131	C3	7124	C4		
2109	A4	2126	C2	2146	C1	2159	C2	3106	C4	3121	A3	3140	B1	3168	B3	4107	C4	4155	A4	7101	B2				
2112	B5	2127	C2	2147	C1	2160	C4	3108	A4	3122	B3	3141	C2	3169	B2	4108	B4	4156	A2	7103	C2				
2113	A4	2131	C2	2149	B2	2161	A3	3109	A4	3123	A3	3143	C2	3175	A2	4109	A3	4157	B3	7106	A4				
2114	A4	2132	C1	2150	B2	2163	A2	3111	A3	3125	A3	3144	C2	3176	C2	4110	A3	4158	C2	7108	A3				
2116	B3	2134	C1	2151	C2	2165	B3	3112	A3	3126	B3	3145	C2	3177	A1	4111	C1	4159	A2	7109	A3				
2117	A3	2136	B1	2152	C3	2166	B2	3114	A3	3127	B3	3146	A1	4101	A4	4120	C2	4160	A1	7111	A1				
2118	B4	2139	B2	2153	C3	2167	B2	3115	A3	3128	B3	3148	A1	4102	A4	4150	B2	6105	A4	7120	B4				

ECO 5 TUNER BOARD / copper side view


5
4
3
2
1
A
B
C
E
D
A
2
3
1
C
5
4
4156
2163
3175
3155
2143
7111
3146
3148
4160
4159
3119
3177
3156
4104
4101
4102
2108
3109
3125
7109
4110
3116
3114
2161
7106
3123
3111
4109
3115
7108
3112
3121
2117
4155
2113
2114
3108
2109
2124
6105
6110
3133
3117
3120
2116
3122
3126
3128
3118
7120
4108
2157
2119
2112
4106
2118
6111
4153
4114
3134
2120
7122
3168
4151
7121
3104
4152
4105
2149
2150
2167
7101
2166
3169
2142
2141
2165
4150
3127
2122
3137
3136
7123
2158
2160
7124
2156
4107
2105
3106
6101
2101
3102
2154
6131
4157
4120
2153
2159
6130
2126
2127
2139
3140
2145
2136
2131
2132
3145
3153
2146
2147
2134
4111
4103
2151
7103
3141
3143
3176
3167
3144
2152
3103
2102
2103
4154
3101
4158
C
A
C
B E

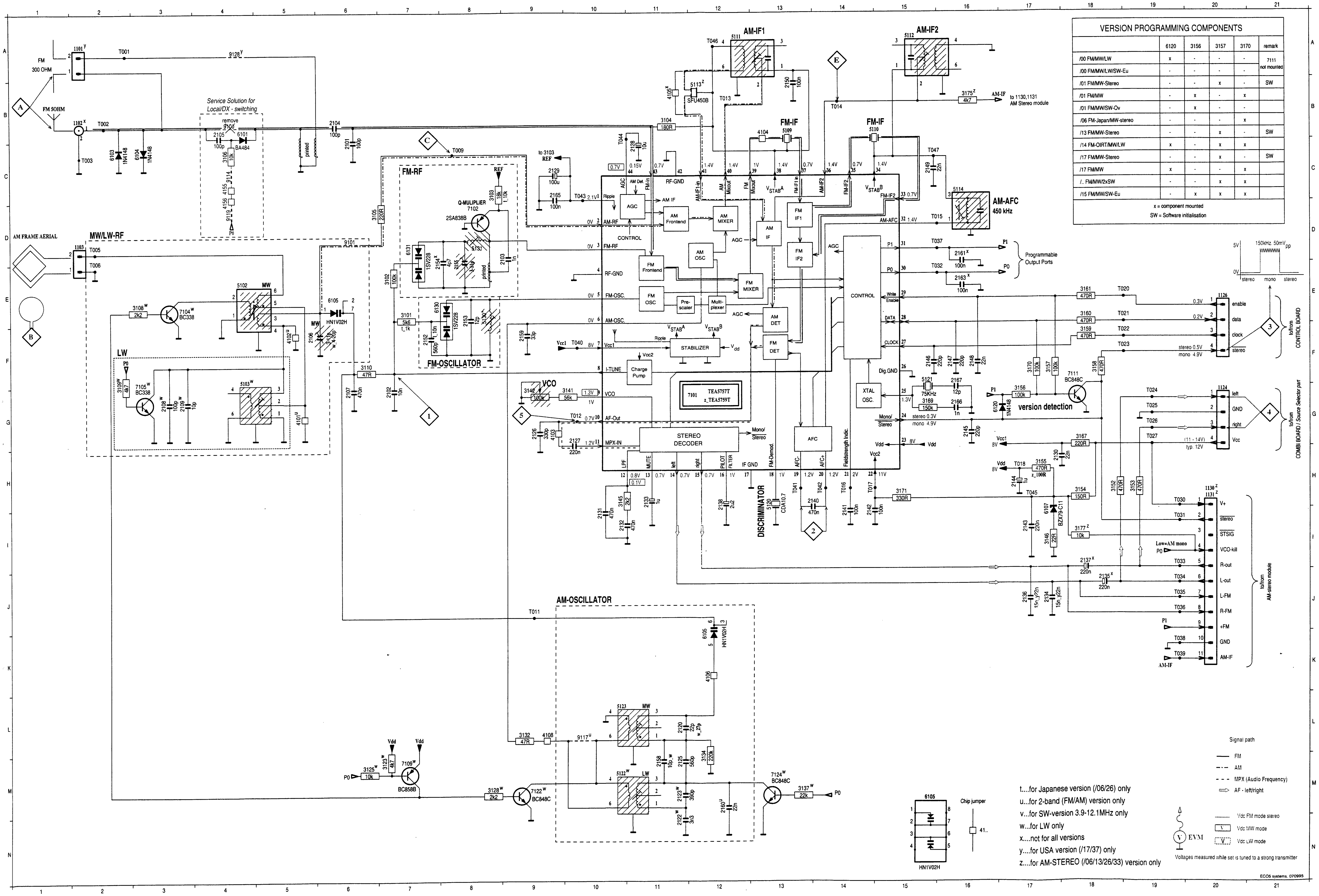
41.. Chip jumper (not all items shown in schematic diagram)

marked components to be assembled as service solution for *Local/DX* - switching

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

ECO5 stage 5, 310895

TUNER BOARD ECO5 / Systems


FM 300 OHM
FM 50HM
AM FRAME AERIAL
MW/LW-RF
MW
LW
Service Solution for Local/DX - switching
remove 9100
FM-RF
Q-MULIPLIER 7102 2SA838B
FM-OSCILLATOR
AM-IF1
AM-IF2
FM-IF
FM-IF
AM-AFC 450 kHz
AGC
AM Frontend
AM MIXER
AM OSC
FM Frontend
FM OSC
Pre-scaler
Multi-plexer
FM MIXER
AM IF
FM IF1
FM IF2
AM DET
FM DET
STABILIZER
Charge Pump
CONTROL
XTAL OSC.
STEREO DECODER
AFC
TEA5757T z_TEA5759T
7101
VCO
DISCRIMINATOR
version detection
Programmable Output Ports
150kHz, 50mVpp
5V
0V
stereo
mono
stereo
enable
data
clock
stereo
to/from CONTROL BOARD
left
GND
right
Vcc
to/from COMBI BOARD / Source Selector part
V+
stereo
STSIG
VCO-kill
R-out
L-out
L-FM
R-FM
+FM
GND
AM-IF
to/from AM-stereo module
Low=AM mono
AM-OSCILLATOR
to 1130,1131 AM Stereo module
Chip jumper
HN1V02H
ECO5 systems. 070995

VERSION PROGRAMMING COMPONENTS	6120	3156	3157	3170	remark
/00 FM/MW/LW	x	-	-	-	7111 not mounted
/00 FM/MW/LW/SW-Eu	-	-	-	-	
/01 FM/MW-Stereo	-	-	x	-	SW
/01 FM/MW	-	x	-	x	
/01 FM/MW/SW-Ov	-	x	-	-	
/06 FM-Japan/MW-stereo	-	-	-	x	
/13 FM/MW-Stereo	-	-	x	-	SW
/14 FM-OIRT/MW/LW	x	-	x	x	
/17 FM/MW-Stereo	-	-	x	-	SW
/17 FM/MW	x	-	-	x	
/.. FM/MW/2xSW	-	-	x	x	
/15 FM/MW/SW-Eu	-	x	x	x	

x = component mounted
SW = Software initialisation

t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) version only

Signal path
— FM
-·- AM
- - - MPX (Audio Frequency)
⇨ AF - left/right

EVM
.... Vdc FM mode stereo
▭ Vdc MW mode
┆V┆ Vdc LW mode

Voltages measured while set is tuned to a strong transmitter

1101	A 1
1102	B 2
1103	D 2
1124	G20
1126	E20
1130	H20
1131	H20
2101	C 6
2102	G 7
2103	D 9
2104	B 6
2106	F 5
2107	G 6
2108	G 3
2109	G 3
2120	L11
2122	N11
2123	M11
2125	M11
2126	G 9
2127	G10
2128	C11
2129	C 9
2130	H17
2131	I10
2132	I10
2133	H11
2134	J17
2135	J18
2136	J17
2137	I18
2138	H12
2140	H14
2141	H14
2142	H14
2143	I17
2144	H17
2145	G16
2146	F15
2147	F16
2148	F16
2149	C15
2150	B13
2152	F 7
2153	E 8
2154	E 7
2155	D 8
2158	M11
2159	F 9
2160	M12
2161	D16
2163	E16
2165	C 9
2166	G16
2167	F16
3101	E 7
3102	E 7
3103	C 8
3104	B11
3105	D 6
3108	E 3
3109	F 2
3110	F 6
3123	M 7
3125	M 6
3128	M 8
3132	L 9
3134	M12
3137	M13
3141	G10
3142	G 9
3145	H10
3146	I17
3152	H18
3153	H19
3154	H18
3155	H17
3156	G17
3157	F17
3158	F18
3159	F18
3160	E18
3161	E18
3167	G18
3169	G15
3170	F17
3171	H15
3175	B16
3177	I18
4101	G 5
4102	F 5
4103	G 9
4104	B13
4105	B11
4106	K12
4108	L 9
5102	E 4
5103	F 4
5109	B13
5110	B14
5111	A13
5112	A15
5113	B12
5114	C16
5120	H13
5121	F15
5122	M11
5123	L11
5130	E 8
5131	D 8
6103	C 2
6104	C 3
6105	K12
6105	E 6
6107	H17
6120	G16
6130	E 7
6131	D 7
7101	G11
7102	D 8
7104	E 3
7105	F 2
7109	M 7
7111	F18
7122	M 9
7124	M13
9100	B 4
9101	D 6
9117	L10
9128	A 4

MISCELLANEOUS

1101	4822 267 31505	SOCKET 2P CLICKFIT

DIODES

6103	4822 130 30621	1N4148
6104	4822 130 30621	1N4148
6105	4822 130 83075	HN1V02H
6107	4822 130 34488	BZX79-C11
6120	4822 130 30621	1N4148
6130	4822 130 82833	1SV228
6131	4822 130 82833	1SV228

TRANSISTORS

7102	4822 130 60093	2SA838B
7111	5322 130 42136	BC848C(CHIP)

INTEGRATED CIRCUITS

7101	4822 209 90924	TEA5757H/V1,RADIO IC

COILS

5102	4822 157 71634	RF-COIL MW
5109	4822 242 70665	CER. FILTER 10,7MHZ
5110	4822 242 70665	CER. FILTER 10,7MHZ
5111	4822 158 60511	AM-IF FILTER 450kHz
5112	4822 157 70302	AM-IF FILTER 450kHz
5114	4822 157 71637	AM-AFC FILTER 450KHZ
5120	4822 242 82065	CER. DISCRIMINATOR
5121	4822 242 81021	QUARTZ 75kHz
5123	4822 157 60517	110µH 8%
5130	4822 156 30947	RF COIL 1,5 TURNS
5131	4822 156 30947	RF COIL 1,5 TURNS

RESISTORS

3105	4822 116 52215	220R	5%	0,16W
3110	4822 116 52195	47R	5%	0,5W
3132	4822 116 52195	47R	5%	0,5W
3142	4822 100 11163	TRIMPOT.100k lin.		
3152	4822 116 52224	470R	5%	0,5W
3154	4822 116 52211	150R	5%	0,5W
3158	4822 116 52224	470R	5%	0,5W
3159	4822 116 52224	470R	5%	0,5W
3160	4822 116 52224	470R	5%	0,5W
3161	4822 116 52224	470R	5%	0,5W
3170	4822 116 52234	100k	5%	0,5W
3171	4822 116 52219	330R	5%	0,5W

CHIP RESISTORS

3101	4822 051 20562	5k6	5%	0,1W
3102	4822 051 20104	100k	5%	0,1W
3103	4822 051 20183	18k	5%	0,1W
3104	4822 051 20181	180R	5%	0,1W
3134	4822 051 20224	220k	5%	0,1W
3140	4822 051 20008	CHIP JUMPER 0805		
3141	4822 051 20563	56k	5%	0,1W
3145	4822 051 20222	2k2	5%	0,1W
3146	4822 051 20229	22R	5%	0,1W
3153	4822 051 20471	470R	5%	0,1W
3155	4822 051 20471	470R	5%	0,1W
3167	4822 051 20221	220R	5%	0,1W

CHIP RESISTORS

3169	4822 051 20154	150k	5%	0,1W
4101	4822 051 20008	CHIP JUMPER 0805		
4102	4822 051 20008	CHIP JUMPER 0805		
4103	4822 051 20008	CHIP JUMPER 0805		
4104	4822 051 20008	CHIP JUMPER 0805		
4105	4822 051 20008	CHIP JUMPER 0805		
4106	4822 051 20008	CHIP JUMPER 0805		
4108	4822 051 20008	CHIP JUMPER 0805		
4111	4822 051 20008	CHIP JUMPER 0805		
4120	4822 051 20008	CHIP JUMPER 0805		
4150	4822 051 10008	CHIP JUMPER1206		
4152	4822 051 10008	CHIP JUMPER1206		
4153	4822 051 10008	CHIP JUMPER1206		
4154	4822 051 10008	CHIP JUMPER1206		
4157	4822 051 10008	CHIP JUMPER1206		
4158	4822 051 10008	CHIP JUMPER1206		
4159	4822 051 10008	CHIP JUMPER1206		

CAPACITORS

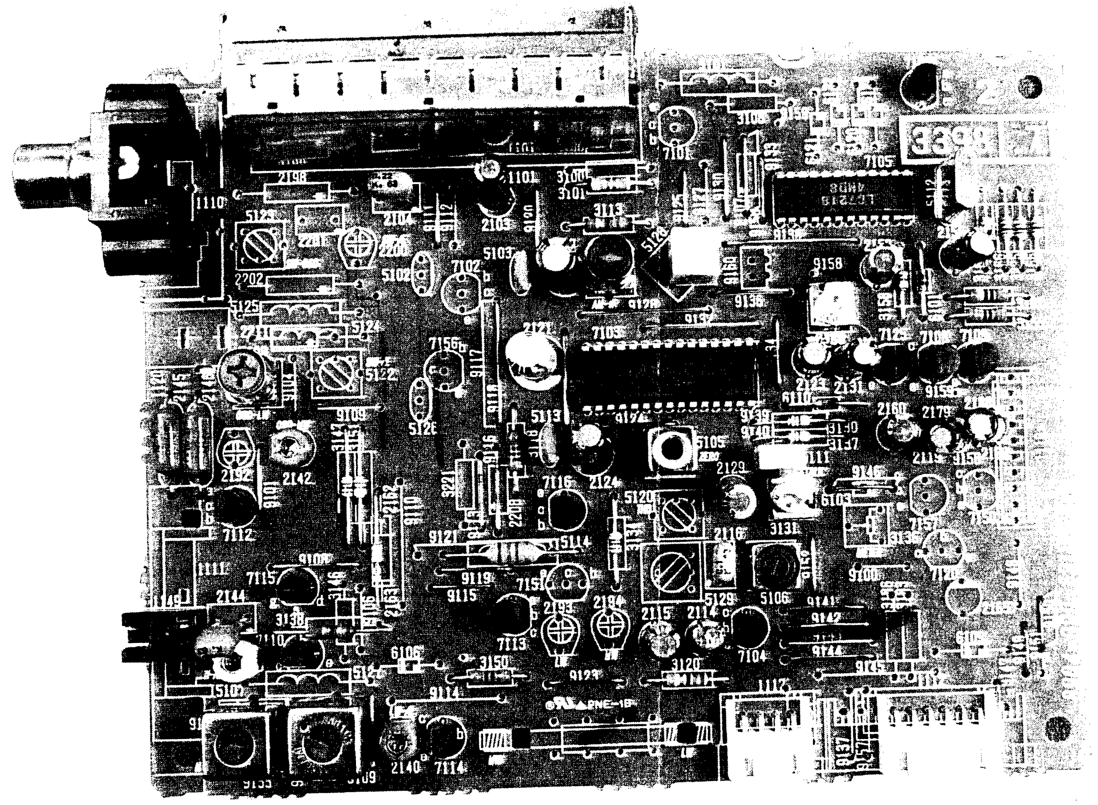
2104	4822 122 33195	100pF	10%	50V
2106	4822 125 60101	10pF	VARIABLE	
2107	4822 121 51252	470nF	5%	63V
2125	4822 121 51381	560pF	1%	400V
2128	4822 124 41579	10µF	20%	50V
2129	4822 124 41584	100µF	20%	10V
2130	4822 126 11585	22nF+80/-20%		50V
2133	4822 124 40242	1µF	20%	63V
2135	4822 124 40746	0,22µF	20%	63V
2137	4822 124 40746	0,22µF	20%	63V
2138	4822 124 41576	2,2µF	20%	50V
2140	4822 121 51252	470nF	5%	63V
2144	4822 124 40242	1µF	20%	63V
2148	4822 126 11585	22nF+80/-20%		50V
2155	4822 125 60101	10pF	VARIABLE	

CHIP CAPACITORS

2101	5322 122 32531	100pF	5%	50V
2102	4822 122 33177	10nF	20%	50V
2103	5322 122 34123	1nF	10%	50V
2120	5322 122 32658	22pF	5%	50V
2126	5322 122 31863	330pF	5%	50V
2127	4822 122 32927	220nF	10%	63V
2131	4822 122 33325	470nF	20%	50V
2132	4822 122 33325	470nF	20%	50V
2134	5322 122 32654	22nF	10%	63V
2136	5322 122 32654	22nF	10%	63V
2141	4822 122 31947	100nF	20%	50V
2142	4822 122 31947	100nF	20%	50V
2143	4822 122 32927	220nF	10%	63V
2145	4822 122 33575	220pF	5%	50V
2146	4822 122 33575	220pF	5%	50V
2147	4822 122 33575	220pF	5%	50V
2149	5322 122 32654	22nF	10%	63V
2150	4822 122 31947	100nF	20%	50V
2152	5322 116 80853	560pF	5%	63V
2153	4822 122 32139	12pF	5%	63V
2159	5322 122 32659	33pF	5%	50V
2160	5322 122 32654	22nF	10%	63V
2165	4822 122 31947	100nF	20%	50V
2166	5322 122 34123	1nF	10%	50V

CHIP CAPACITORS

2167	4822 122 32139	12pF	5%	63V



TUNER 94 BOARD

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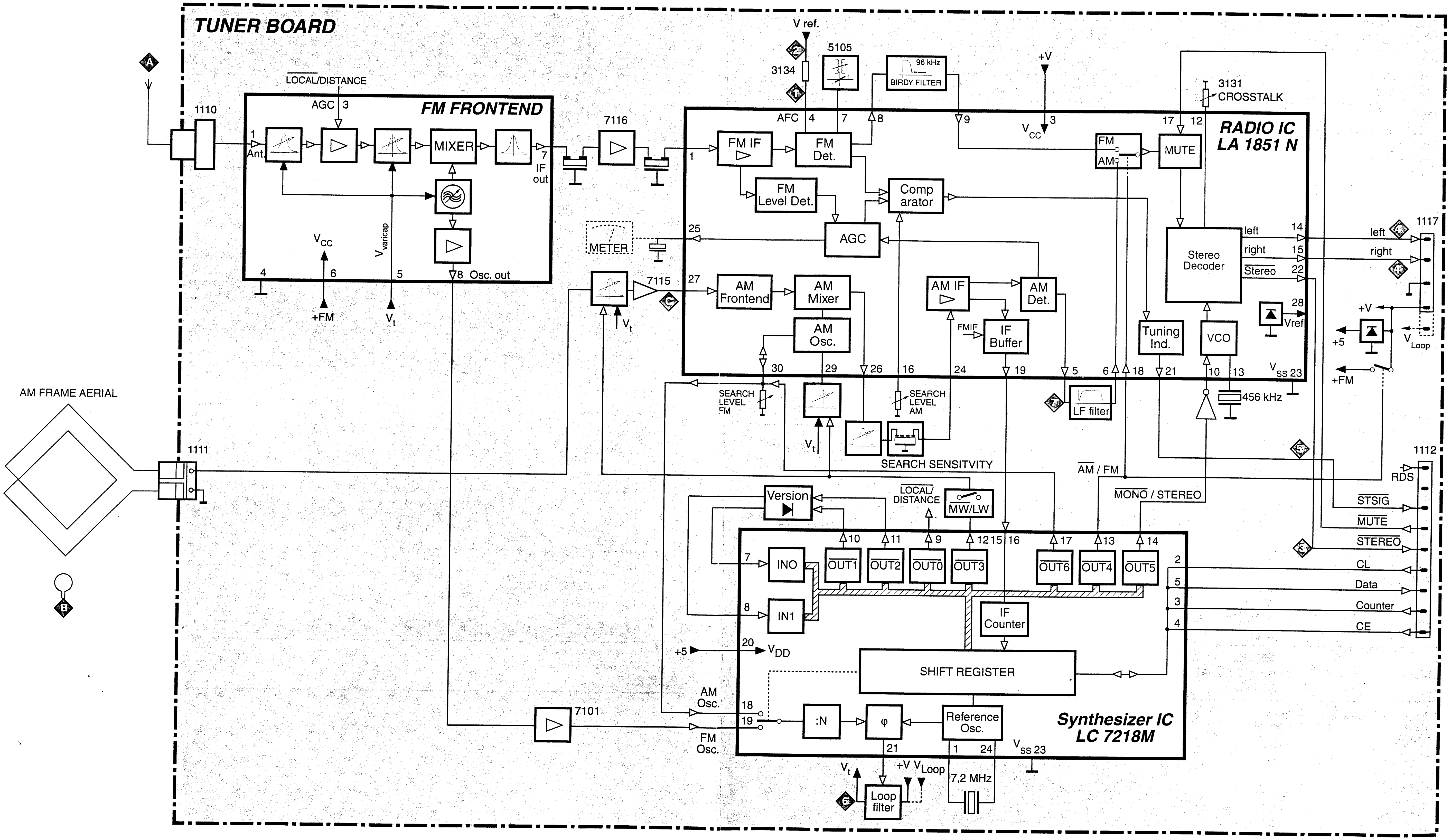
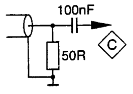
Partslist 7C-4

BLOCKDIAGRAM


TUNER BOARD
FM FRONTEND
RADIO IC
LA 1851 N
Synthesizer IC
LC 7218M
AM FRAME AERIAL
1110
1111
1112
1117
7116
7115
7101
5105
3134
3131
CROSSTALK
V ref.
LOCAL/DISTANCE
AGC 3
1 Ant.
MIXER
7 IF out
Vcc
4
6
5
8 Osc. out
+FM
Vt
Vvaricap
METER
AFC
FM IF
FM Det.
FM Level Det.
AGC
Comp arator
96 kHz
BIRDY FILTER
+V
MUTE
FM
AM
Stereo Decoder
left
right
Stereo
Vref
AM Frontend
AM Mixer
AM Osc.
AM IF
AM Det.
FMIF
IF Buffer
Tuning Ind.
VCO
456 kHz
LF filter
SEARCH LEVEL FM
SEARCH LEVEL AM
SEARCH SENSITVITY
Vss 23
+5
+FM
VLoop
RDS
AM / FM
MONO / STEREO
STSIG
MUTE
STEREO
CL
Data
Counter
CE
Version
LOCAL/ DISTANCE
MW/LW
INO
IN1
OUT1
OUT2
OUT0
OUT3
OUT6
OUT4
OUT5
IF Counter
SHIFT REGISTER
VDD
AM Osc.
FM Osc.
:N
φ
Reference Osc.
7,2 MHz
Loop filter
+V VLoop
Vt

ADJUSTMENT TABLE

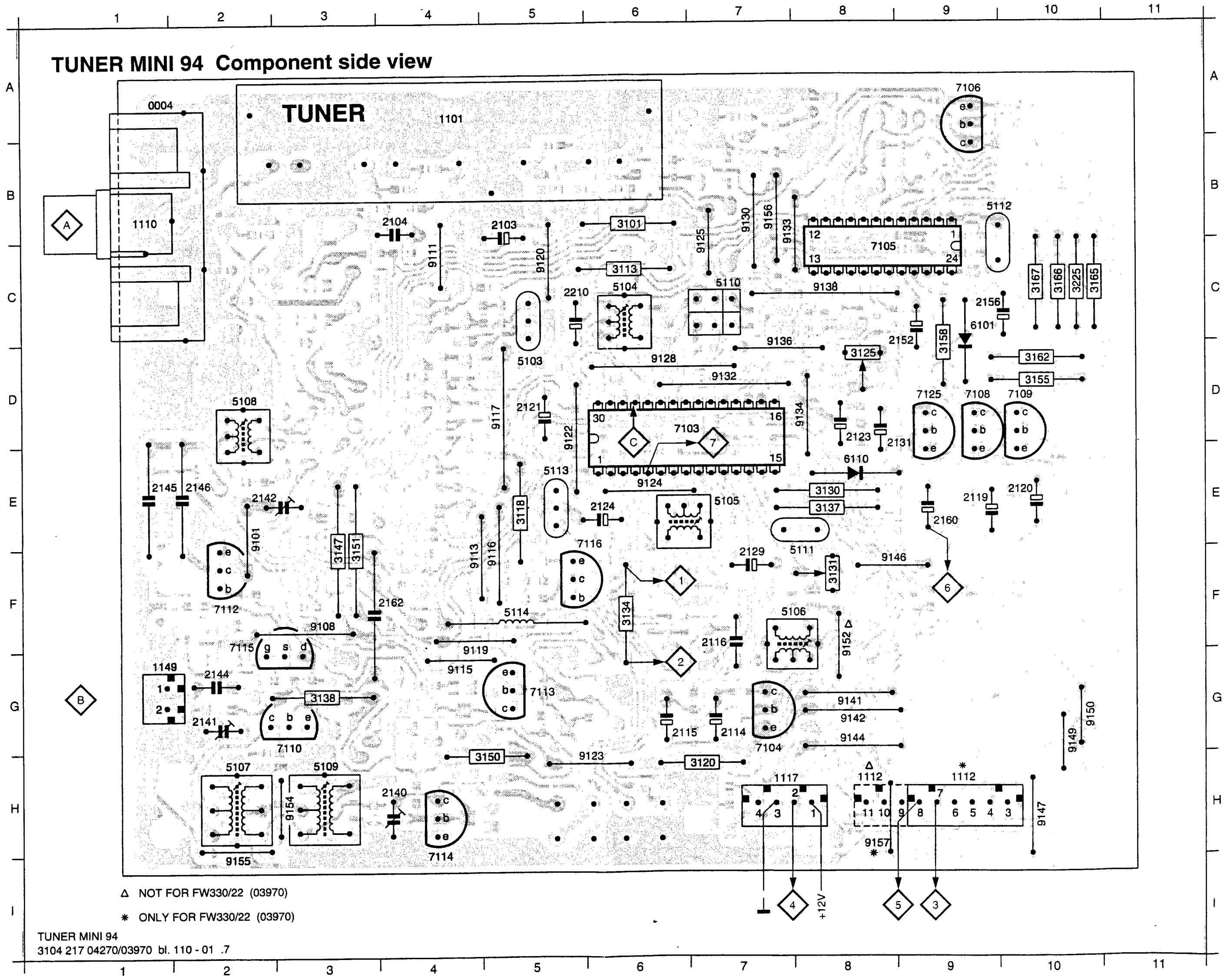
Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (50kHz grid)			108MHz	check	6	7...9V
			87.5MHz	check		1.3...2V
LW 153 - 279kHz (3kHz grid)			279kHz	5108		8.5V ±0.1V
			153kHz	check		0.7...1.5V
MW 522 - 1611kHz (9kHz grid)			1611kHz	2142		8V ±0.1V
			522kHz	check		0.7...1.7V
FM IF						
FM	98MHz 1mV mod=1kHz Δf=75kHz	A	98MHz	5105	1 2	0V ±20mV
STEREO CROSSTALK						
FM	98MHz 1mV 90% L + 9% pilot	A	98MHz	check	3	low < 1V
				3131	4	right channel min.
SEARCH SENSITIVITY						
FM	98MHz 12µV mod=1kHz Δf=75kHz	A		3125	5	switches just from high to low
AM IF						
MW	1494kHz Δf=10kHz as low as possible			5104	7	symmetrical and max. height
AM RF						
LW	155kHz mod=1kHz, 30% AM 270kHz	B*	155kHz	5109	7	MAX
			270kHz	2140		
MW	558kHz mod=1kHz, 30% AM 1494kHz		558kHz	5107		MAX
			1494kHz	2141		

* Signal supplied via frame antenna

↕ Repeat

0004	A1	2115	G6	2141	G2	3101	B6	3147	F3	5103	D5	5113	E5	7110	G3	9113	F4	9128	D6
1101	A4	2116	F7	2142	E2	3113	C6	3150	H4	5104	C6	5114	F5	7112	F2	9115	G4	9130	B7
1110	B1	2119	E9	2144	G2	3118	E5	3151	F3	5105	E7	6101	C9	7113	G5	9116	F5	9132	D7
1112	H8	2120	E10	2145	E1	3120	H7	3155	D10	5106	F7	6110	E8	7114	I4	9117	D5	9133	C7
1112	H9	2121	D5	2146	E2	3125	D8	3158	D9	5107	H2	7103	D6	7115	F2	9119	G4	9134	D8
1117	H7	2123	D8	2152	D8	3130	E8	3162	D10	5108	D2	7104	H7	7116	F5	9120	C5	9136	D7
1149	G1	2124	E6	2156	C9	3131	F8	3165	C10	5109	H3	7105	C8	7125	D9	9122	E5	9138	C8
2103	B5	2129	F7	2160	E9	3134	F6	3166	C10	5110	C7	7106	A9	9101	F2	9123	H5	9141	G8
2104	B4	2131	E8	2162	F3	3137	E8	3167	C10	5111	F7	7108	D9	9108	F3	9124	E6	9142	G8
2114	G7	2140	H4	2210	C5	3138	G3	3225	C10	5112	B9	7109	D10	9111	C4	9125	C7	9144	G8

TUNER MINI 94 Component side view

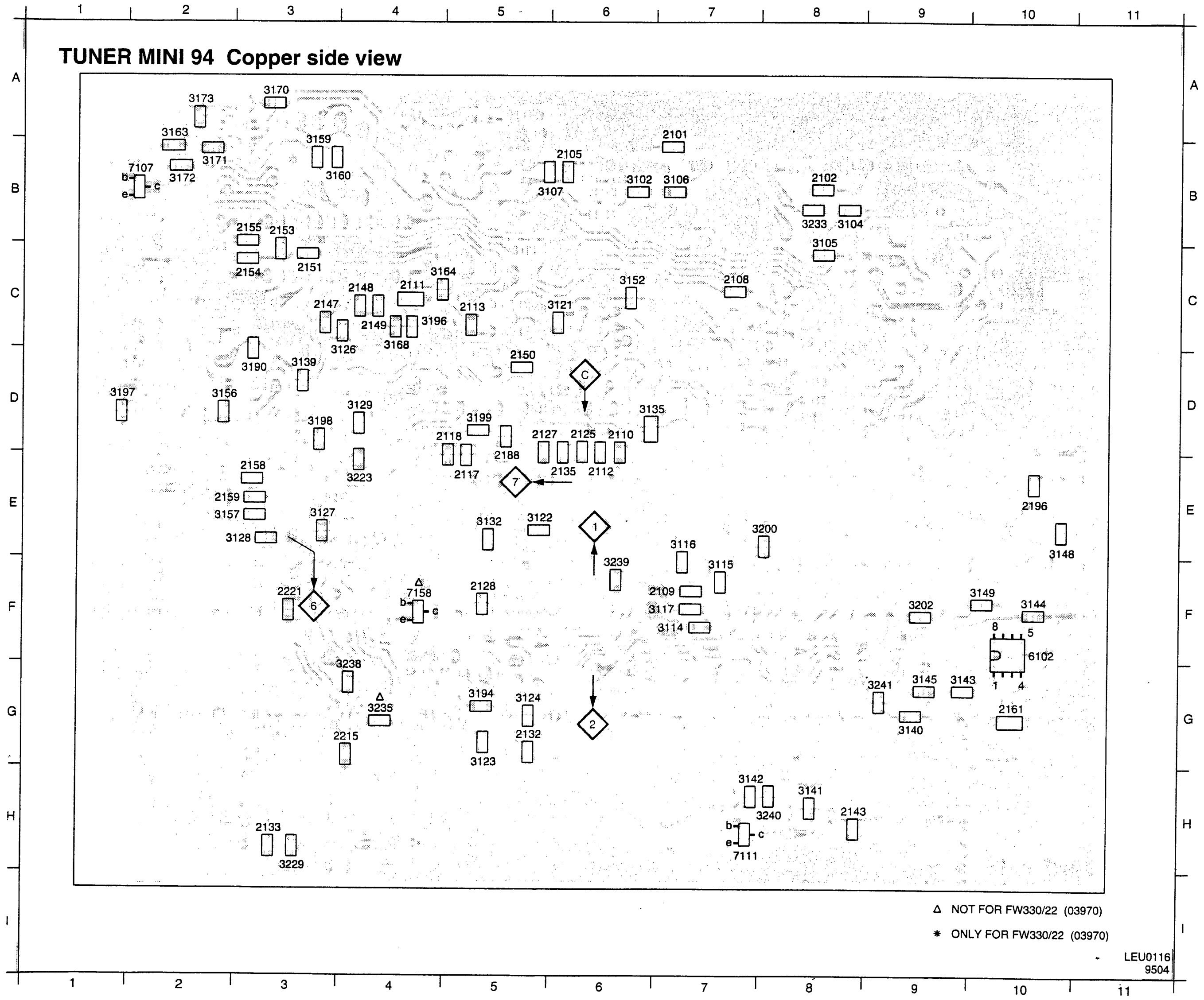

TUNER
0004
1101
1110
1149
A
B
1
2
3
4
5
6
7
7103
7105
7106
7104
7108
7109
7110
7112
7113
7114
7115
7116
7125
5103
5104
5105
5106
5107
5108
5109
5110
5111
5112
5113
5114
1112
1117
9155
9157
+12V
A B C D E F G H I
1 2 3 4 5 6 7 8 9 10 11

Δ NOT FOR FW330/22 (03970)

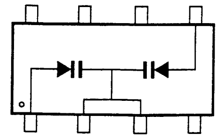
✱ ONLY FOR FW330/22 (03970)

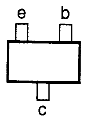
TUNER MINI 94
3104 217 04270/03970 bl. 110 - 01 .7

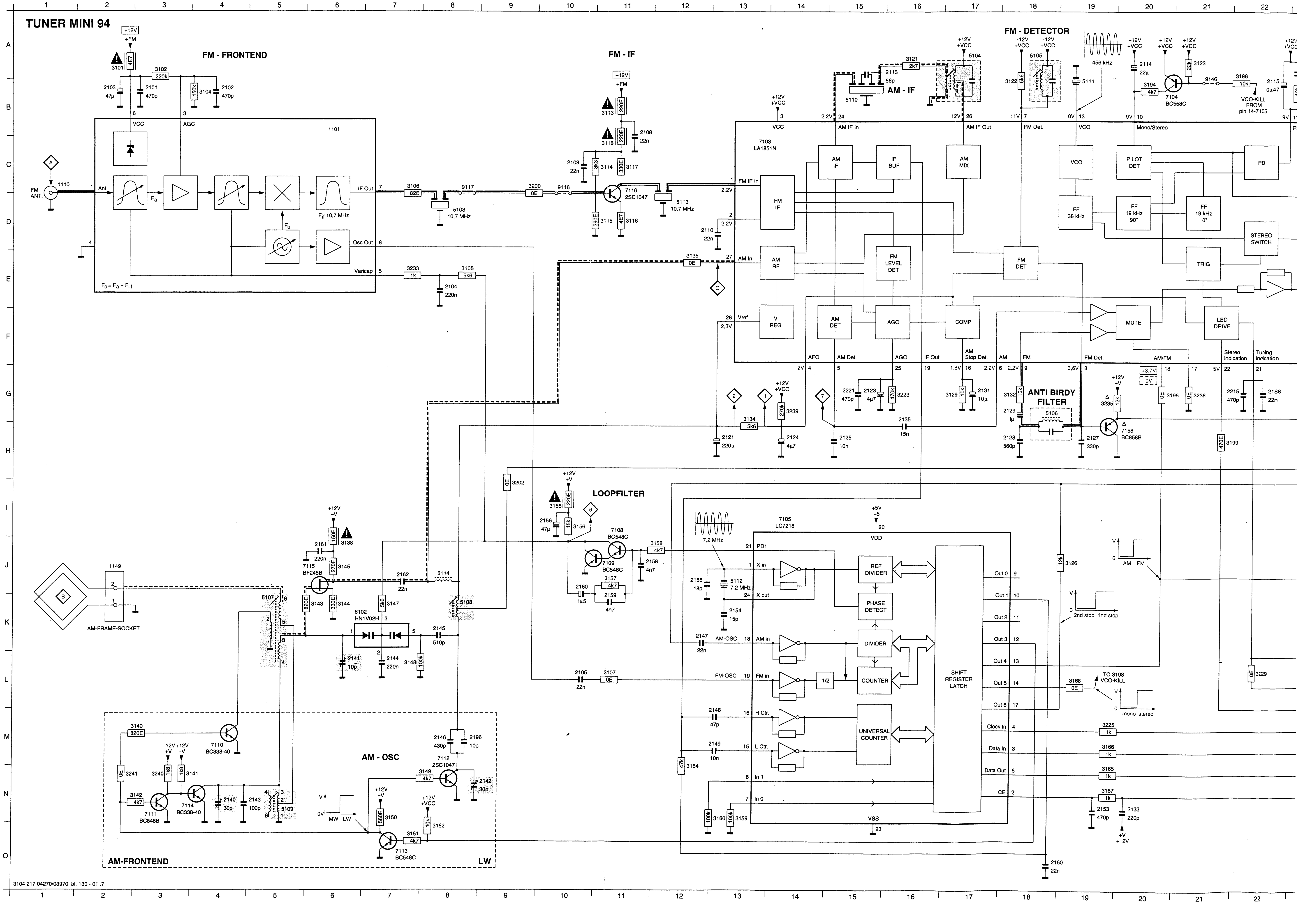
2101	A7	2118	D4	2149	C4	2196	E10	3116	E7	3132	E5	3149	F10	3171	B2	3202	F9	7107	B1
2102	B8	2125	D6	2150	D5	2215	G3	3117	F6	3135	D6	3152	C6	3172	B2	3223	E4	7111	H7
2105	B6	2127	D5	2151	C3	2221	F3	3121	C5	3139	D3	3156	D2	3173	A2	3229	H3	7158	F4
2108	C7	2128	F5	2153	B3	3102	B6	3122	E5	3140	G9	3157	E2	3190	D3	3233	B8		
2109	F6	2132	G5	2154	C2	3104	B8	3123	H5	3141	H8	3159	B3	3194	G5	3235	G4		
2110	D6	2133	H3	2155	B2	3105	C8	3124	G5	3142	H7	3160	B3	3196	C4	3238	G3		
2111	C4	2135	E5	2158	E3	3106	B7	3126	D3	3143	G9	3163	A2	3197	D1	3239	F6		
2112	E6	2143	H8	2159	E2	3107	B5	3127	E3	3144	F10	3164	C4	3198	D3	3240	H7		
2113	C5	2147	C3	2161	G10	3114	F7	3128	E2	3145	G9	3168	D4	3199	D5	3241	G9		
2117	E5	2148	C4	2188	E5	3115	F7	3129	D4	3148	E10	3170	A3	3200	E7	6102	F10		

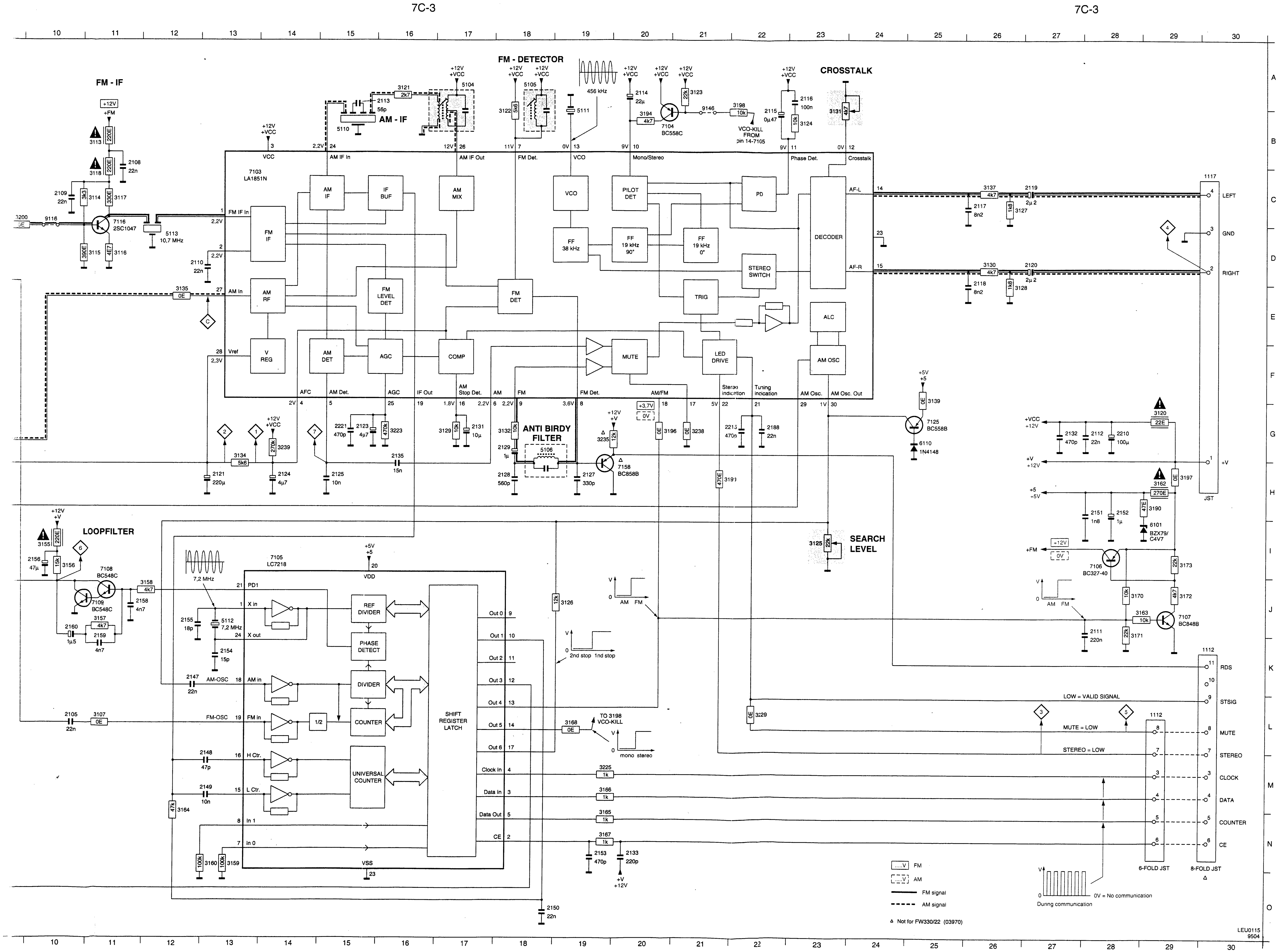

TUNER MINI 94 Copper side view
1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
I
3170
3173
3163
3171
7107
3172
3159
3160
2105
3107
2101
3102
3106
2102
3233
3104
3105
2155
2153
2154
2151
3164
2148
2111
2147
2149
3196
3168
3126
2113
3121
3152
2108
3190
3139
2150
3197
3156
3129
3198
3199
2118
2188
2127
2125
2110
3135
2117
2135
2112
3223
2158
2159
3157
3127
3128
3132
3122
3116
3115
3200
2196
3148
2221
7158
2128
3239
2109
3117
3114
3202
3149
3144
6102
3238
3235
3194
3124
2215
3123
2132
3241
3145
3143
3140
2161
3142
3240
3141
2143
7111
2133
3229
C
7
1
6
2
△ NOT FOR FW330/22 (03970)
* ONLY FOR FW330/22 (03970)
LEU0116
9504

IC 6102






TUNER MINI 94
FM - FRONTEND
FM - IF
AM - IF
FM - DETECTOR
456 kHz
VCO-KILL FROM pin 14-7105
1101
VCC
AGC
Ant
Fa
Fif 10,7 MHz
IF Out
Osc Out
Varicap
Fo
Fo = Fa + Fif
FM ANT.
1110
7103 LA1851N
FM IF In
AM In
Vref
AM IF In
AM IF Out
FM Det.
VCO
Mono/Stereo
AM IF
IF BUF
AM MIX
FM IF
AM RF
FM LEVEL DET
FM DET
V REG
AM DET
AGC
COMP
PILOT DET
PD
FF 38 kHz
FF 19 kHz 90°
FF 19 kHz 0°
STEREO SWITCH
TRIG
MUTE
LED DRIVE
AFC
AM Det.
IF Out
AM Stop Det.
AM
FM
AM/FM
Stereo indication
Tuning indication
ANTI BIRDY FILTER
7116 2SC1047
5103 10,7 MHz
5113 10,7 MHz
7104 BC558C
7158 BC858B
LOOPFILTER
7108 BC548C
7109 BC548C
7105 LC7218
7,2 MHz
5112 7,2 MHz
PD1
X in
X out
AM in
FM in
H Ctr.
L Ctr.
In 1
In 0
VDD
VSS
AM-OSC
FM-OSC
REF DIVIDER
PHASE DETECT
DIVIDER
COUNTER
1/2
UNIVERSAL COUNTER
SHIFT REGISTER LATCH
Out 0
Out 1
Out 2
Out 3
Out 4
Out 5
Out 6
Clock In
Data In
Data Out
CE
AM FM
2nd stop 1nd stop
TO 3198 VCO-KILL
mono stereo
1149
AM-FRAME-SOCKET
7115 BF245B
6102 HN1V02H
AM - OSC
7110 BC338-40
7114 BC338-40
7111 BC848B
7112 2SC1047
7113 BC548C
MW LW
AM-FRONTEND
LW
+12V
+FM
+VCC
+V
+5V


7C-3
7C-3
FM - IF
FM - DETECTOR
AM - IF
CROSSTALK
7103 LA1851N
FM IF
AM IF
IF BUF
AM MIX
VCO
PILOT DET
PD
FF 38 kHz
FF 19 kHz 90°
FF 19 kHz 0°
DECODER
STEREO SWITCH
AM RF
FM LEVEL DET
FM DET
TRIG
ALC
V REG
AM DET
AGC
COMP
MUTE
LED DRIVE
AM OSC
456 kHz
7116 2SC1047
5113 10,7 MHz
7104 BC558C
VCO-KILL FROM pin 14-7105
ANTI BIRDY FILTER
7158 BC858B
7125 BC558B
6110 1N4148
SEARCH LEVEL
LOOPFILTER
7108 BC548C
7109 BC548C
7105 LC7218
7,2 MHz
5112 7,2 MHz
REF DIVIDER
PHASE DETECT
DIVIDER
COUNTER
UNIVERSAL COUNTER
SHIFT REGISTER LATCH
1/2
TO 3198 VCO-KILL
mono stereo
2nd stop 1nd stop
AM FM
6101 BZX79/ C4V7
7106 BC327-40
7107 BC848B
1117
LEFT
GND
RIGHT
+V
JST
1112
RDS
STSIG
MUTE
STEREO
CLOCK
DATA
COUNTER
CE
LOW = VALID SIGNAL
MUTE = LOW
STEREO = LOW
6-FOLD JST
8-FOLD JST
FM
AM
FM signal
AM signal
Δ Not for FW330/22 (03970)
0V = No communication
During communication
LEU0115
9504

1101	B6	3196	G20
1110	C1	3197	H29
1112	L29	3198	A22
1112	K30	3199	H21
1117	C30	3200	C9
1149	J2	3202	I9
2101	B3	3223	G16
2102	B4	3225	M19
2103	B2	3229	L22
2104	E8	3233	E7
2105	L10	3235	G19
2108	B11	3238	G21
2109	C10	3239	G14
2110	D12	3240	N3
2111	J28	3241	N2
2112	G28	5103	D8
2113	A15	5104	A17
2114	A20	5105	A18
2115	B22	5106	G18
2116	A23	5107	K5
2117	C26	5108	K8
2118	D26	5109	N5
2119	C26	5110	B15
2120	D26	5111	B19
2121	H13	5112	J13
2123	G15	5113	D12
2124	H14	5114	J8
2125	H15	6101	I29
2127	H19	6102	K6
2128	H18	6110	G25
2129	G18	7103	C13
2131	G17	7104	B20
2132	G27	7105	I14
2133	N20	7106	I28
2135	G16	7107	J29
2140	N4	7108	I11
2141	L6	7109	J11
2142	N9	7110	M4
2143	N5	7111	N3
2144	L7	7112	M8
2145	K8	7113	O7
2146	M8	7114	N3
2147	K12	7115	J5
2148	M12	7116	C11
2149	M12	7125	G25
2150	O18	7158	H20
2151	H28	9116	C10
2152	H28	9117	C8
2153	N19	9146	B21
2154	K13		
2155	J12		
2156	I10		
2158	J11		
2159	K11		
2160	J10		
2161	J6		
2162	J7		
2188	G22		
2196	M8		
2210	G28		
2215	G21		
2221	G15		
3101	A2		
3102	A3		
3104	B4		
3105	E8		
3106	C7		
3107	L11		
3113	B11		
3114	C11		
3115	D11		
3116	D11		
3117	C11		
3118	C11		
3120	G29		
3121	A16		
3122	B18		
3123	A21		
3124	B23		
3125	I23		
3126	J19		
3127	C26		
3128	E26		
3129	G17		
3130	D26		
3131	B23		
3132	G18		
3134	G13		
3135	E12		
3137	C26		
3138	J6		
3139	G25		
3140	M2		
3141	N3		
3142	N2		
3143	K6		
3144	K6		
3145	J6		
3147	K7		
3148	L7		
3149	N7		
3150	N7		
3151	O7		
3152	O8		
3155	I10		
3156	I10		
3157	J11		
3158	J11		
3159	N13		
3160	N13		
3162	H29		
3163	J28		
3164	N12		
3165	N19		
3166	M19		
3167	N19		
3168	L19		
3170	J28		
3171	K28		
3172	J29		
3173	I29		
3190	H29		
3194	B20		

Remarks

ELECTRICAL PARTSLIST TUNER 94 BOARD

MISCELLANEOUS

1101	4822 210 10492	FRONTEND ASSY /02/08
1110	4822 267 10283	SOCKET COAX IEC 75R

DIODES

6101	4822 130 34174	BZX79-B4V7
6102	4822 130 83075	HN1V02H
6110	4822 130 30621	1N4148

TRANSISTORS

7104	5322 130 60068	BC558C
7106	4822 130 41327	BC327-40
7107	5322 130 41982	BC848 (CHIP)
7108	4822 130 44196	BC548C
7109	4822 130 44196	BC548C
7110	5322 130 44779	BC338-40
7111	5322 130 41982	BC848 (CHIP)
7112	4822 130 60163	2SC1047
7113	4822 130 44196	BC548C
7114	5322 130 44779	BC338-40
7115	4822 130 41024	BF245B
7116	4822 130 60163	2SC1047
7125	4822 130 44197	BC558B
7158	5322 130 41983	BC858B(CHIP)

INTEGRATED CIRCUITS

7103	4822 209 31001	LA1851N
7105	4822 209 30178	LC7218

COILS

5103	4822 242 81249	CER. FILTER 10,7MHz
5104	4822 157 63029	AM IF COIL
5105	4822 157 63904	Q-DETECION COIL
5106	4822 157 71661	ANTI-BIRDY FILTER
5107	4822 157 71094	ANT. COIL MW, 3-BAND
5108	4822 157 63912	OSC.COIL AM 3-BAND
5109	4822 157 71093	ANT. COIL LW
5110	4822 242 71878	CERAM.FILTER 450kHz
5111	4822 242 81248	CERAM. RES. 19kHz
5112	4822 242 72976	CER.RESONATOR 7,2MHz
5113	4822 242 81249	CER. FILTER 10,7MHz
5114	4822 157 51503	560µH

RESISTORS

3101	4822 052 10478	4R7	5%	NFR
3113	4822 053 10221	220R	5%	1W
3118	4822 050 22201	220R	2%	0,25W
3120	4822 052 10229	22R	5%	0,33W
3125	4822 100 11213	22k	30%	POT.
3130	4822 116 52283	4k7	5%	0,5W
3131	4822 100 11319	4k7		trimpot.
3134	4822 116 52289	5k6	5%	0,16W
3137	4822 116 52283	4k7	5%	0,5W
3138	4822 116 83922	150R	5%	1W
3147	4822 116 52289	5k6	5%	0,16W
3150	4822 050 25601	560R	1%	0,6W
3151	4822 116 52283	4k7	5%	0,5W
3155	4822 050 22201	220R	2%	0,25W
3158	4822 116 52283	4k7	5%	0,5W

RESISTORS

3162	4822 050 22701	270R	1%	0,6W
3165	4822 050 11002	1k	5%	0,2W
3166	4822 050 11002	1k	5%	0,2W
3167	4822 050 11002	1k	5%	0,2W
3225	4822 050 11002	1k	5%	0,2W

CHIP RESISTORS

3102	4822 051 20224	220k	5%	0,1W
3104	4822 051 20154	150k	5%	0,1W
3105	4822 051 20562	5k6	5%	0,1W
3106	4822 051 20829	82R	5%	0,1W
3107	4822 051 20008	CHIP JUMPER 0805		
3114	4822 051 20332	3k3	5%	0,1W
3115	4822 051 20391	390R	5%	0,1W
3116	4822 051 20478	4R7	5%	0,1W
3117	4822 051 20331	330R	5%	0,1W
3121	4822 051 20272	2k7	5%	0,1W
3122	4822 051 20562	5k6	5%	0,1W
3123	4822 051 20223	22k	5%	0,1W
3124	4822 117 10833	10k	1%	0,1W
3126	4822 051 20123	12k	2%	0,1W
3127	4822 051 20182	1k8	5%	0,1W
3128	4822 051 20182	1k8	5%	0,1W
3129	4822 117 10833	10k	1%	0,1W
3132	4822 117 10833	10k	1%	0,1W
3133	4822 051 20008	CHIP JUMPER 0805		
3135	4822 051 10008	CHIP JUMPER1206		
3139	4822 051 20008	CHIP JUMPER 0805		
3140	4822 051 20821	820R	5%	0,1W
3141	4822 051 20182	1k8	5%	0,1W
3142	4822 051 20472	4k7	5%	0,1W
3143	4822 051 20821	820R	5%	0,1W
3144	4822 051 20331	330R	5%	0,1W
3145	4822 051 20271	270R	5%	0,1W
3148	4822 051 20104	100k	5%	0,1W
3149	4822 051 20472	4k7	5%	0,1W
3152	4822 117 10833	10k	1%	0,1W
3156	4822 051 20153	15k	5%	0,1W
3157	4822 051 20472	4k7	5%	0,1W
3159	4822 051 20104	100k	5%	0,1W
3160	4822 051 20104	100k	5%	0,1W
3163	4822 117 10833	10k	1%	0,1W
3164	4822 051 10473	47k	2%	0,25W
3164	4822 051 20473	47k	5%	0,1W
3168	4822 051 20008	CHIP JUMPER 0805		
3170	4822 117 10833	10k	1%	0,1W
3171	4822 051 20223	22k	5%	0,1W
3172	4822 051 20472	4k7	5%	0,1W
3173	4822 051 20223	22k	5%	0,1W
3190	4822 051 20479	47R	5%	0,1W
3194	4822 051 20472	4k7	5%	0,1W
3196	4822 051 20008	CHIP JUMPER 0805		
3197	4822 051 20008	CHIP JUMPER 0805		
3198	4822 117 10833	10k	1%	0,1W
3199	4822 051 20471	470R	5%	0,1W
3200	4822 051 20008	CHIP JUMPER 0805		
3202	4822 051 20008	CHIP JUMPER 0805		
3223	4822 051 20474	470k	5%	0,1W
3229	4822 051 20008	CHIP JUMPER 0805		
3233	4822 051 10102	1k	2%	0,25W
3235	4822 051 20123	12k	2%	0,1W

ELECTRICAL PARTSLIST TUNER 94 BOARD

CHIP RESISTORS

3236	4822 051 20008	CHIP JUMPER 0805		
3238	4822 051 20008	CHIP JUMPER 0805		
3239	4822 051 20274	270k	5%	0,1W
3240	4822 051 20182	1k8	5%	0,1W
3241	4822 051 20008	CHIP JUMPER 0805		

CAPACITORS

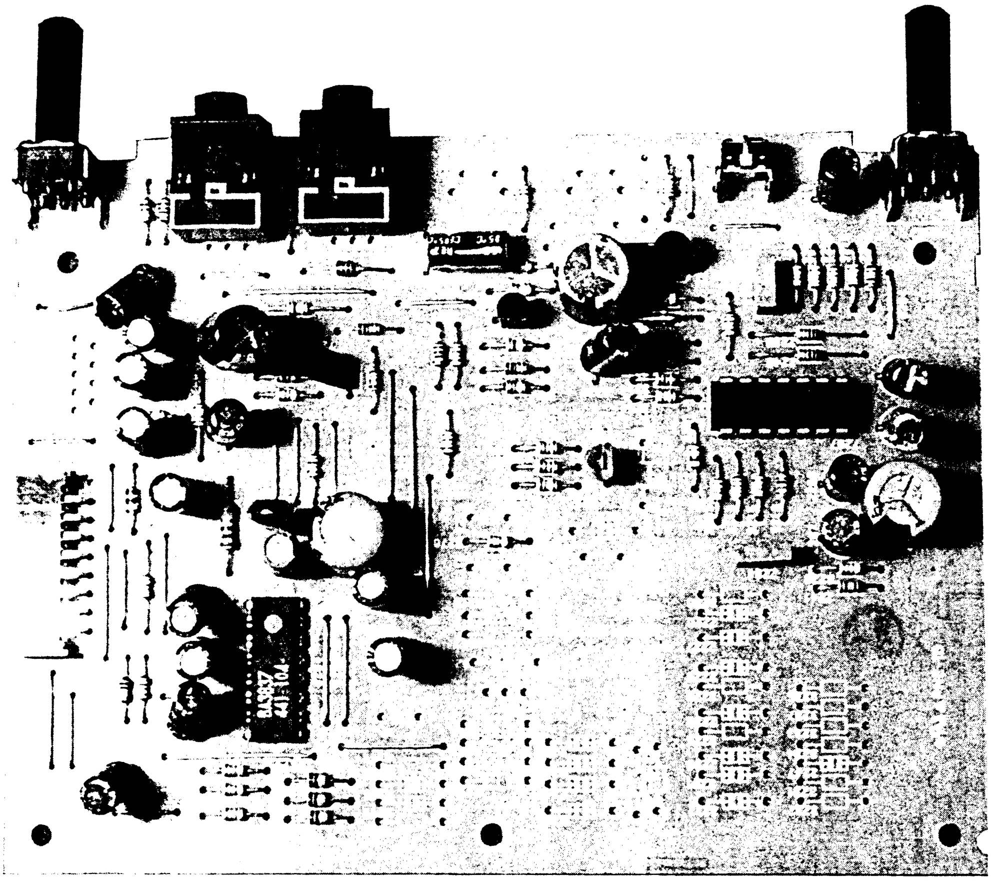
2103	4822 124 40433	47µF	20%	25V
2104	4822 121 42408	220nF	5%	63V
2114	5322 124 41431	22µF	20%	25V
2115	4822 124 40239	0,47µF	20%	63V
2116	5322 121 42386	100nF	5%	63V
2119	4822 124 40244	2,2µF	20%	63V
2120	4822 124 40244	2,2µF	20%	63V
2121	4822 124 40196	220µF	20%	16V
2123	4822 124 40246	4,7µF	20%	63V
2124	4822 124 40246	4,7µF	20%	63V
2129	4822 124 40242	1µF	20%	63V
2131	4822 124 40248	10µF	20%	63V
2140	4822 125 60102	30pF		VARIABLE
2141	4822 125 60101	10pF		VARIABLE
2142	4822 125 60102	30pF		VARIABLE
2144	4822 121 42408	220nF	5%	63V
2145	4822 121 51263	510pF	1%	400V
2146	4822 121 70082	430pF	1%	400V
2152	4822 124 40242	1µF	20%	63V
2156	4822 124 40433	47µF	20%	25V
2160	4822 124 41631	1,5µF	20%	50V
2162	4822 126 11585	22nF+80/-20%		50V
2210	4822 124 41643	100µF	20%	16V

CHIP CAPACITORS

2101	5322 122 34099	470pF	10%	63V
2102	5322 122 32268	470pF	10%	50V
2105	5322 122 32654	22nF	10%	63V
2108	5322 122 32654	22nF	10%	63V
2109	5322 122 32654	22nF	10%	63V
2110	5322 122 32654	22nF	10%	63V
2111	4822 122 32927	220nF	10%	63V
2112	5322 122 32654	22nF	10%	63V
2113	5322 122 32661	56pF	5%	50V
2117	4822 122 33336	8,2nF	10%	50V
2118	4822 122 33336	8,2nF	10%	50V
2125	4822 122 33177	10nF	20%	50V
2126	4822 122 31782	15nF	10%	50V
2127	5322 122 31863	330pF	5%	50V
2128	5322 116 80853	560pF	5%	63V
2132	5322 122 32268	470pF	10%	50V
2133	5322 126 10794	220pF	10%	
2135	4822 122 33128	15nF	10%	63V
2143	5322 122 32531	100pF	5%	50V
2147	5322 122 32654	22nF	10%	63V
2148	5322 122 32452	47pF	5%	50V
2149	4822 122 33177	10nF	20%	50V
2150	5322 122 32654	22nF	10%	63V
2151	5322 122 34099	470pF	10%	63V
2151	4822 122 33219	1,8nF	10%	50V
2153	5322 122 34099	470pF	10%	63V
2154	5322 122 32481	15pF	5%	50V
2155	5322 122 32965	18pF	5%	50V
2158	5322 126 10223	4,7nF	10%	63V
2159	5322 126 10223	4,7nF	10%	63V

CHIP CAPACITORS

2161	4822 122 32927	220nF	10%	63V
2188	5322 122 32654	22nF	10%	63V
2196	5322 122 32448	10pF	5%	50V
2215	5322 122 32268	470pF	10%	50V
2216	5322 122 32268	470pF	10%	50V
2221	5322 122 32268	470pF	10%	50V



KARAOKE BOARD

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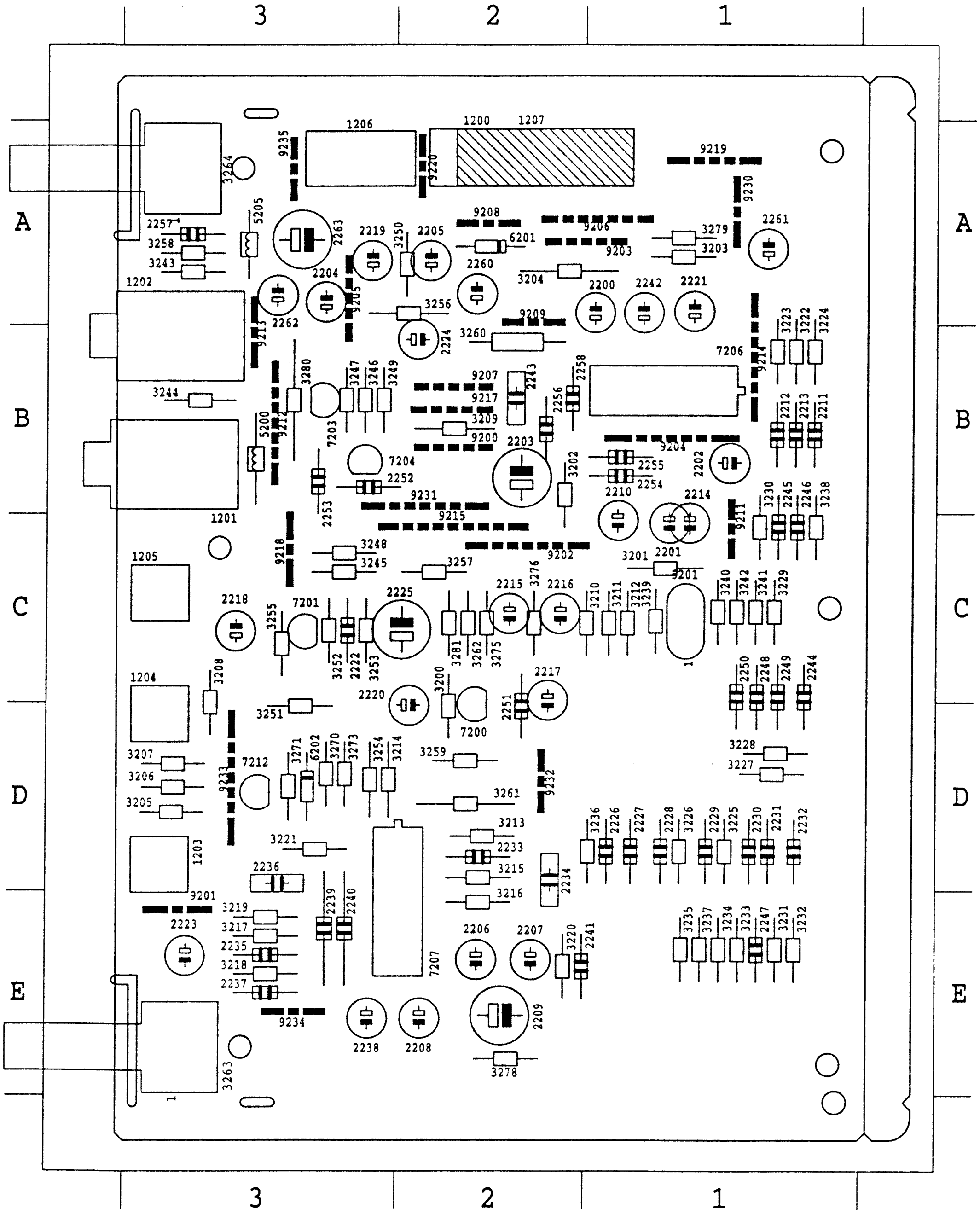
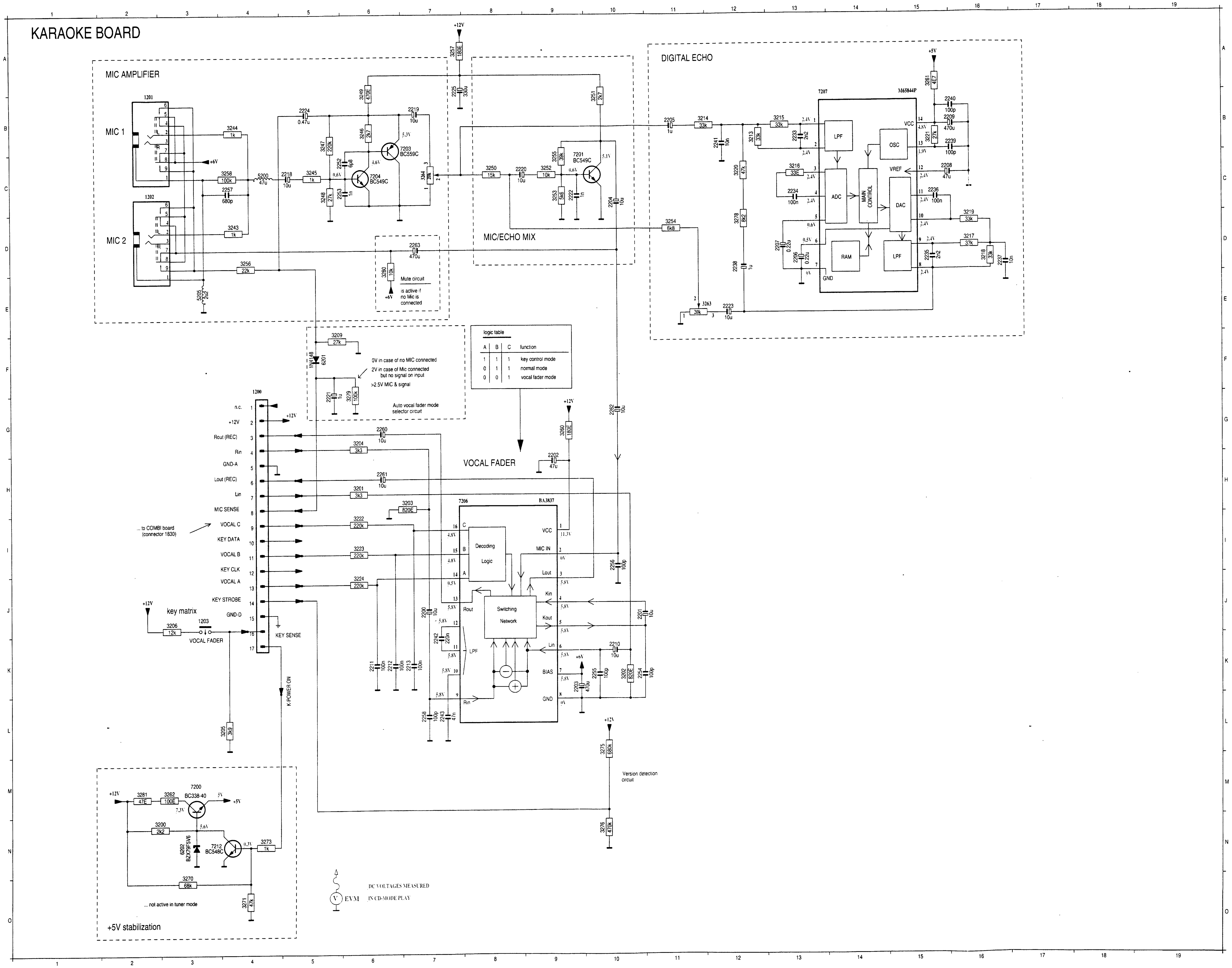
COMPONENT LAYOUT COPPERSIDE VIEW


3
2
1
A
B
C
D
E
1206
1200
1207
9235
9220
9219
3264
9230
5205
2257
3258
3243
2263
9208
2219
3250
2205
6201
9206
9203
3279
3203
2261
2260
3204
2200
2242
2221
1202
2204
9205
2262
9213
3256
2224
3260
9209
3223
3222
3224
7206
9214
3280
3247
3246
3249
9207
9217
2243
2258
2256
3244
3209
2212
2213
2211
5200
9212
7203
9200
2203
9204
7204
3202
2202
2255
2254
2253
2252
9231
2210
2214
3230
2245
2246
3238
9211
1201
9215
9218
3248
3245
9202
3201
2201
3257
3276
9201
1205
2225
2215
2216
3210
3211
3212
3239
3240
3242
3241
3229
2218
7201
3255
3252
2222
3253
3281
3262
3275
1204
3208
2250
2248
2249
2244
2217
3200
2220
2251
3251
7200
3228
3227
3207
3206
3205
7212
9233
3271
6202
3270
3273
3254
3214
3259
9232
3261
3213
2233
3215
3216
2234
3236
2226
2227
2228
3226
2229
3225
2230
2231
2232
1203
3221
2236
9201
2223
3219
3217
2235
3218
2237
2239
2240
7207
2206
2207
3220
2241
3235
3237
3234
3233
2247
3231
3232
9234
2238
2208
2209
3263
3278

3254	D 3	2258	B 2	1204	D 3
3255	C 3	2260	A 2	1205	C 3
3256	A 2	2261	A 1	1206	A 3
3257	C 2	2262	A 3	1207	A 2
3258	A 3	2263	A 3	2200	A 1
3259	D 2	3200	D 2	2201	C 1
3260	B 2	3201	C 1	2202	B 1
3261	D 2	3202	B 2	2203	B 2
3262	C 2	3203	A 1	2204	A 3
3263	E 3	3204	A 2	2205	A 2
3264	A 3	3205	D 3	2206	E 2
3270	D 3	3206	D 3	2207	E 2
3271	D 3	3207	D 3	2208	E 2
3273	D 3	3208	D 3	2209	E 2
3275	C 2	3209	B 2	2210	C 1
3276	C 2	3210	C 1	2211	B 1
3278	E 2	3211	C 1	2212	B 1
3279	A 1	3212	C 1	2213	B 1
3280	B 3	3213	D 2	2214	C 1
3281	C 2	3214	D 3	2215	C 2
5200	B 3	3215	D 2	2216	C 2
5201	C 1	3216	E 2	2217	C 2
5205	A 3	3217	E 3	2218	C 3
6201	A 2	3218	E 3	2219	A 3
6202	D 3	3219	E 3	2220	D 2
7200	D 2	3220	E 2	2221	A 1
7201	C 3	3221	D 3	2222	C 3
7203	B 3	3222	B 1	2223	E 3
7204	B 3	3223	B 1	2224	B 2
		3224	B 1	2225	C 2
7206	B 1	3225	D 1	2226	D 1
7207	E 2	3226	D 1	2227	D 1
7212	D 3	3227	D 1	2228	D 1
9200	B 2	3228	D 1	2229	D 1
9201	E 3	3229	C 1	2230	D 1
9202	C 2	3230	C 1	2231	D 1
9203	A 1	3231	E 1	2232	D 1
9204	B 1	3232	E 1	2233	D 2
9205	A 3	3233	E 1	2234	D 2
9206	A 1	3234	E 1	2235	E 3
9207	B 2	3235	E 1	2236	D 3
9208	A 2	3236	D 1	2237	E 3
9209	A 2	3237	E 1	2238	E 3
9211	C 1	3238	C 1	2239	E 3
9212	B 3	3239	C 1	2240	E 3
9213	B 3	3240	C 1	2241	E 2
9214	B 1	3241	C 1	2242	A 1
9215	C 2	3242	C 1	2243	B 2
9217	B 2	3243	A 3	2244	C 1
9218	C 3	3244	B 3	2245	C 1
9219	A 1	3245	C 3	2246	C 1
9220	A 2	3246	B 3	2247	E 1
9230	A 1	3247	B 3	2248	C 1
9231	B 2	3248	C 3	2249	C 1
9232	D 2	3249	B 3	2250	C 1
9233	D 3	3250	A 2	2251	D 2
9234	E 3	3251	D 3	2252	B 3
9235	A 3	3252	C 3	2253	B 3
T313	A 1	3253	C 3	2254	B 1
2255	B 1	1201	B 3		
2256	B 2	1202	B 3		
2257	A 3	1203	D 3		


KARAOKE BOARD
MIC AMPLIFIER
MIC 1
MIC 2
1201
1202
+6V
3244 1k
3258 100k
2257 680p
3243 1k
3256 22k
5205 2k2
5200 47u
2224 0.47u
2218 10u
3245 1k
3247 220k
3248 27k
2252 6p8
2253 1n
7204 BC549C
7203 BC559C
3246 2k7
3249 470E
2219 10u
3264 20k
+12V
3257 180E
2225 330u
2263 470u
3280 10k
Mute circuit
is active if no Mic is connected
MIC/ECHO MIX
3251 2k7
3250 15k
2220 10u
3252 10k
3255 39k
3253 5k6
2222 1n
7201 BC549C
2204 10u
3254 6k8
DIGITAL ECHO
2205 1u
3214 33k
2241 10n
3213 33k
3215 33k
2233 2n2
3220 47k
3278 8k2
2238 1u
3216 33E
2234 100n
2207 0.22u
2206 0.22u
7207
M65844P
LPF
ADC
MAIN CONTROL
OSC
VREF
DAC
RAM
VCC
GND
+5V
3261 4E7
2240 100p
2209 470u
3221 27k
2239 100p
2208 47u
2236 100n
3219 33k
3217 33k
3218 33k
2235 2n2
2237 10n
3263 20k
2223 10u
3209 27k
1N4148 6201
2221 1u
3279 100k
0V in case of no MIC connected
2V in case of Mic connected but no signal on input
>2.5V MIC & signal
Auto vocal fader mode selector circuit
1200
n.c.
+12V
Rout (REC)
Rin
GND-A
Lout (REC)
Lin
MIC SENSE
VOCAL C
KEY DATA
VOCAL B
KEY CLK
VOCAL A
KEY STROBE
GND-D
KEY SENSE
K-POWER ON
...to COMBI board (connector 1830)
key matrix
3206 12k
1203
VOCAL FADER
2260 10u
3204 3k3
2261 10u
3201 3k3
3203 820E
3222 220k
3223 220k
3224 220k
VOCAL FADER
3260 180E
2202 47u
7206
BA3837
Decoding Logic
Switching Network
LPF
Rout
Rin
MIC IN
Lout
Kin
Kout
Lin
BIAS
2262 10u
2256 100p
2201 10u
2210 10u
2200 10u
2242 220n
2211 100n
2212 100n
2213 100n
2258 100p
2243 47n
2203 470u
2255 100p
3202 820E
2254 100p
3205 3k9
3275 680k
Version detection circuit
3276 470k
+5V stabilization
3281 47E
3262 100E
7200 BC338-40
3200 2k2
6202 BZX79F5V6
7212 BC548C
3273 1k
3270 68k
3271 47k
...not active in tuner mode
DC VOLTAGES MEASURED IN CD-MODE PLAY
EVM

logic table

A	B	C	function
1	1	1	key control mode
0	1	1	normal mode
0	0	1	vocal fader mode

1200	F 4
1201	B 2
1202	C 2
1203	J 3
2200	J 7
2201	J10
2202	H 9
2203	K 9
2204	C10
2205	B11
2206	D13
2207	D13
2208	C15
2209	B16
2210	K10
2211	K 6
2212	K 6
2213	K 7
2218	C 5
2219	B 7
2220	C 8
2221	F 5
2222	C 9
2223	E12
2224	B 5
2225	A 7
2233	B13
2234	C13
2235	D15
2236	C15
2237	D16
2238	D12
2239	B16
2240	B16
2241	B12
2242	K 7
2243	L 7
2252	C 6
2253	C 6
2254	K10
2255	K10
2256	I10
2257	C 4
2258	L 7
2260	G 6
2261	H 6
2262	G10
2263	D 7
3200	N 2
3201	H 6
3202	K10
3203	H 7
3204	G 6
3205	L 4
3206	J 3
3209	F 5
3213	B12
3214	B11
3215	B13
3216	C13
3217	D16
3218	D16
3219	D16
3220	C12
3221	B15
3222	I 6
3223	I 6
3224	J 6
3243	D 4
3244	B 4
3245	C 5
3246	B 6
3247	B 5
3248	C 5
3249	A 6
3250	C 8
3251	B10
3252	C 9
3253	C 9
3254	D11
3255	C 9
3256	D 4
3257	A 7
3258	C 4
3260	G 9
3261	A15
3262	M 3
3263	E12
3264	C 7
3270	O 3
3271	O 4
3273	N 4
3275	L10
3276	N10
3278	D12
3279	F 6
3280	D 6
3281	M 2
5200	C 4
5205	E 3
6201	F 5
6202	N 3
7200	M 3
7201	C 9
7203	B 6
7204	C 6
7206	H 8
7207	B13
7212	N 4

ELECTRICAL PARTSLIST KARAOKE BOARD

MISCELLANEOUS

1201	4822 267 31792	MICROPHONE SOCKET
1202	4822 267 31792	MICROPHONE SOCKET
1203	4822 276 13614	TACT SWITCH

DIODES

6201	4822 130 30621	1N4148
6202	4822 130 34173	BZX79-B5V6

TRANSISTORS

7200	5322 130 44779	BC338-40
7201	4822 130 44246	BC549C
7203	5322 130 42625	BC559C
7204	4822 130 44246	BC549C
7212	4822 130 44196	BC548C

INTEGRATED CIRCUITS

7206	4822 209 90408	BA3837
7207	4822 209 90407	M65844P

COILS

5200	4822 157 53906	47µH	10%
5205	4822 157 62552	2,2µH	

RESISTORS

3200	4822 116 52256	2k2	5%	0,16W
3201	4822 116 52269	3k3	5%	0,5W
3202	4822 116 52231	820R	5%	0,5W
3203	4822 116 52231	820R	5%	0,5W
3204	4822 116 52269	3k3	5%	0,5W
3205	4822 116 52276	3k9	5%	0,5W
3206	4822 116 52238	12k	5%	0,5W
3209	4822 116 52264	27k	5%	0,5W
3213	4822 116 52271	33k	5%	0,16W
3214	4822 116 52271	33k	5%	0,16W
3215	4822 116 52271	33k	5%	0,16W
3216	4822 116 52191	33R	5%	0,5W
3217	4822 116 52271	33k	5%	0,16W
3218	4822 116 52271	33k	5%	0,16W
3219	4822 116 52271	33k	5%	0,16W
3220	4822 116 52284	47k	5%	0,5W
3221	4822 116 52264	27k	5%	0,5W
3222	4822 116 83874	220k	5%	0,5W
3223	4822 116 83874	220k	5%	0,5W
3224	4822 116 83874	220k	5%	0,5W
3243	4822 050 11002	1k	5%	0,2W
3244	4822 050 11002	1k	5%	0,2W
3245	4822 050 11002	1k	5%	0,2W
3246	4822 116 52263	2k7	5%	0,5W
3247	4822 116 83874	220k	5%	0,5W
3248	4822 116 52264	27k	5%	0,5W
3249	4822 116 52224	470R	5%	0,5W
3250	4822 116 52244	15k	5%	0,5W
3251	4822 116 52263	2k7	5%	0,5W
3252	4822 116 83864	10k	5%	0,5W
3253	4822 116 52289	5k6	5%	0,16W
3254	4822 116 52296	6k8	5%	0,5W
3255	4822 116 83882	39k	5%	0,5W
3256	4822 116 52257	22k	5%	0,5W
3257	4822 116 52213	180R	5%	0,5W
3258	4822 116 52234	100k	5%	0,5W
3260	4822 116 52213	180R	5%	0,5W

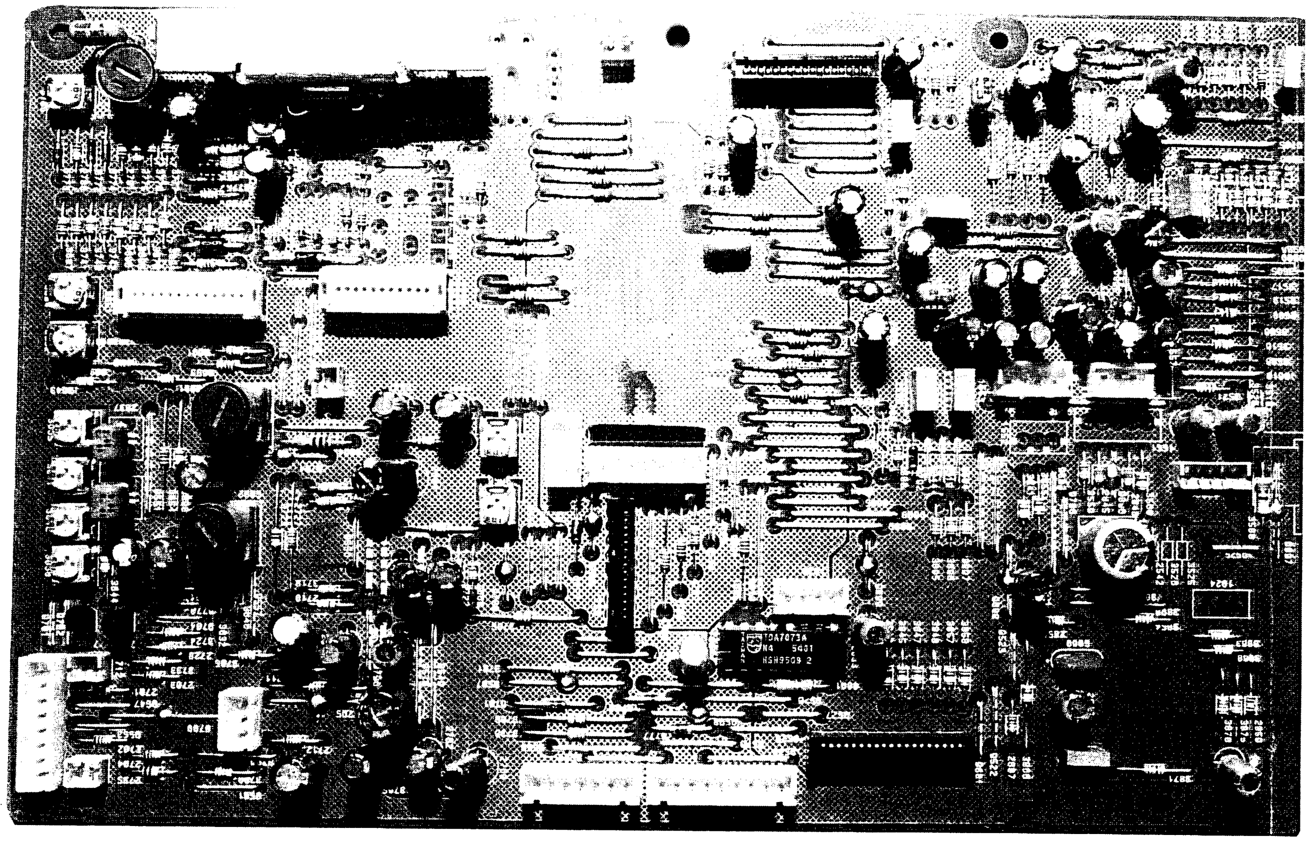
RESISTORS

3261	4822 050 24708	4R7	1%	0,6W
3262	4822 116 52175	100R	5%	0,5W
3263	4822 100 12268	20k	POTMETER	
3264	4822 100 12268	20k	POTMETER	
3270	4822 116 52297	68k	5%	0,5W
3271	4822 116 52284	47k	5%	0,5W
3273	4822 050 11002	1k	5%	0,2W
3275	4822 116 52298	680k	5%	0,5W
3275	4822 116 52298	680k	5%	0,5W
3276	4822 116 52285	470k	5%	0,5W
3278	4822 116 52303	8k2	5%	0,5W
3279	4822 116 52234	100k	5%	0,5W
3280	4822 116 83864	10k	5%	0,5W
3281	4822 116 52195	47R	5%	0,5W

CAPACITORS

2200	4822 124 41579	10µF	20%	50V
2201	4822 124 41579	10µF	20%	50V
2201	4822 124 41579	10µF	20%	50V
2202	4822 124 40433	47µF	20%	25V
2203	4822 124 41997	470µF	20%	10V
2204	4822 124 41579	10µF	20%	50V
2205	4822 124 40242	1µF	20%	63V
2206	4822 124 40746	0,22µF	20%	63V
2207	4822 124 40746	0,22µF	20%	63V
2208	4822 124 40433	47µF	20%	25V
2209	4822 124 41997	470µF	20%	10V
2210	4822 124 41579	10µF	20%	50V
2211	4822 126 12882	100nF	20%	50V
2212	4822 126 12882	100nF	20%	50V
2213	4822 126 12882	100nF	20%	50V
2218	4822 124 41579	10µF	20%	50V
2219	4822 124 41579	10µF	20%	50V
2220	4822 124 41579	10µF	20%	50V
2221	4822 124 40242	1µF	20%	63V
2222	4822 122 33197	1nF	10%	50V
2223	4822 124 41579	10µF	20%	50V
2224	4822 124 41407	0,47µF	20%	63V
2225	4822 124 40849	330µF	20%	16V
2233	4822 126 12339	2,2nF	10%	16V
2234	5322 121 42386	100nF	5%	63V
2235	4822 126 12339	2,2nF	10%	16V
2236	5322 121 42386	100nF	5%	63V
2237	4822 121 51387	10nF	20%	16V
2238	4822 124 40242	1µF	20%	63V
2239	4822 122 33195	100pF	10%	50V
2240	4822 122 33195	100pF	10%	50V
2241	4822 121 51387	10nF	20%	16V
2242	4822 124 40746	0,22µF	20%	63V
2243	4822 121 43526	47nF	5%	100V
2252	4822 126 12572	6,8pF	5%	50V
2253	4822 122 33197	1nF	10%	50V
2254	4822 122 33195	100pF	10%	50V
2255	4822 122 33195	100pF	10%	50V
2256	4822 122 33195	100pF	10%	50V
2257	4822 122 33169	680pF	10%	50V
2258	4822 122 33195	100pF	10%	50V
2260	4822 124 41579	10µF	20%	50V
2261	4822 124 41579	10µF	20%	50V
2262	4822 124 41579	10µF	20%	50V
2263	4822 124 41997	470µF	20%	10V

Remarks



COMBI BOARD

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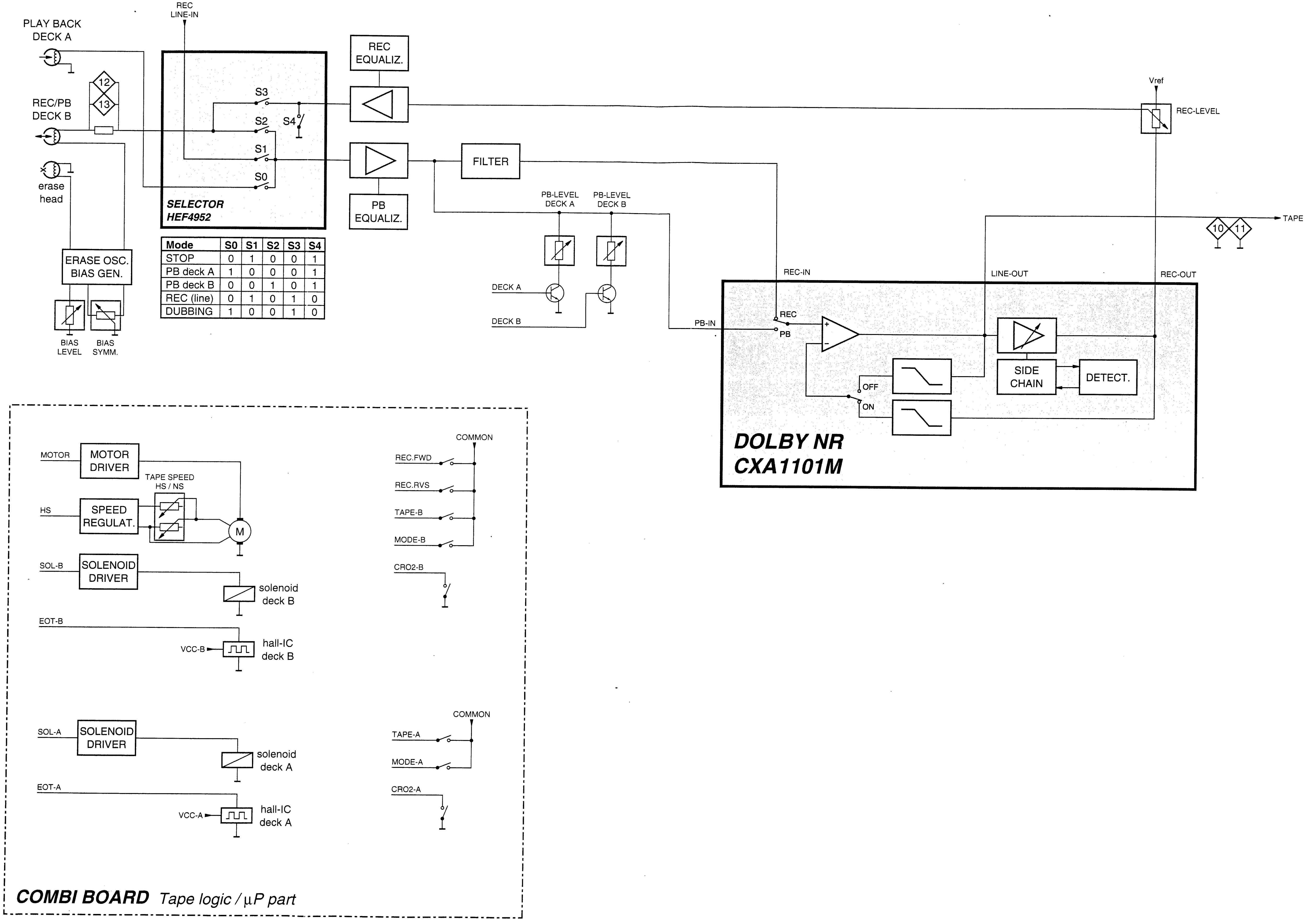
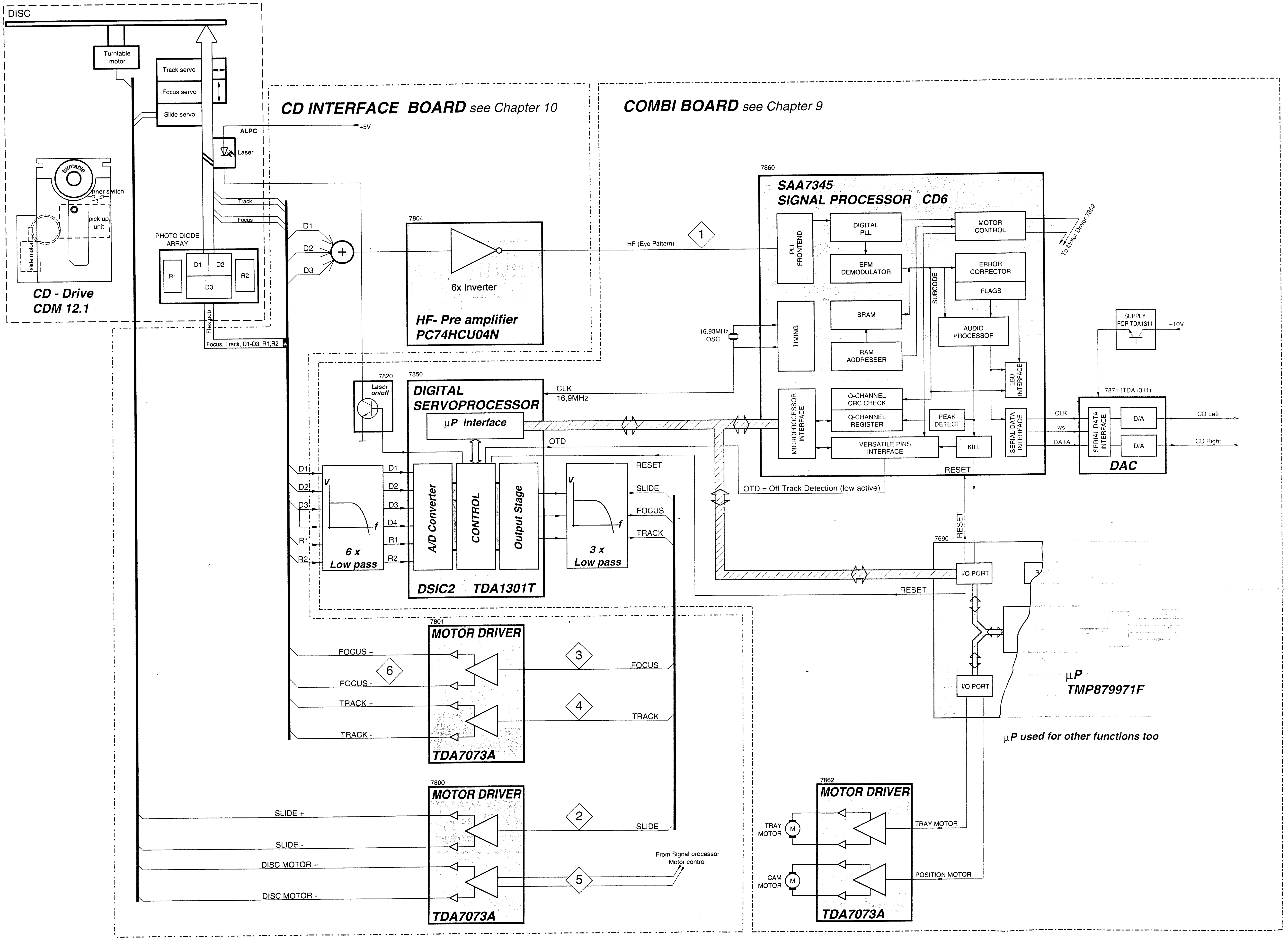
Remarks

FUNCTIONAL DIAGRAM TAPE PART

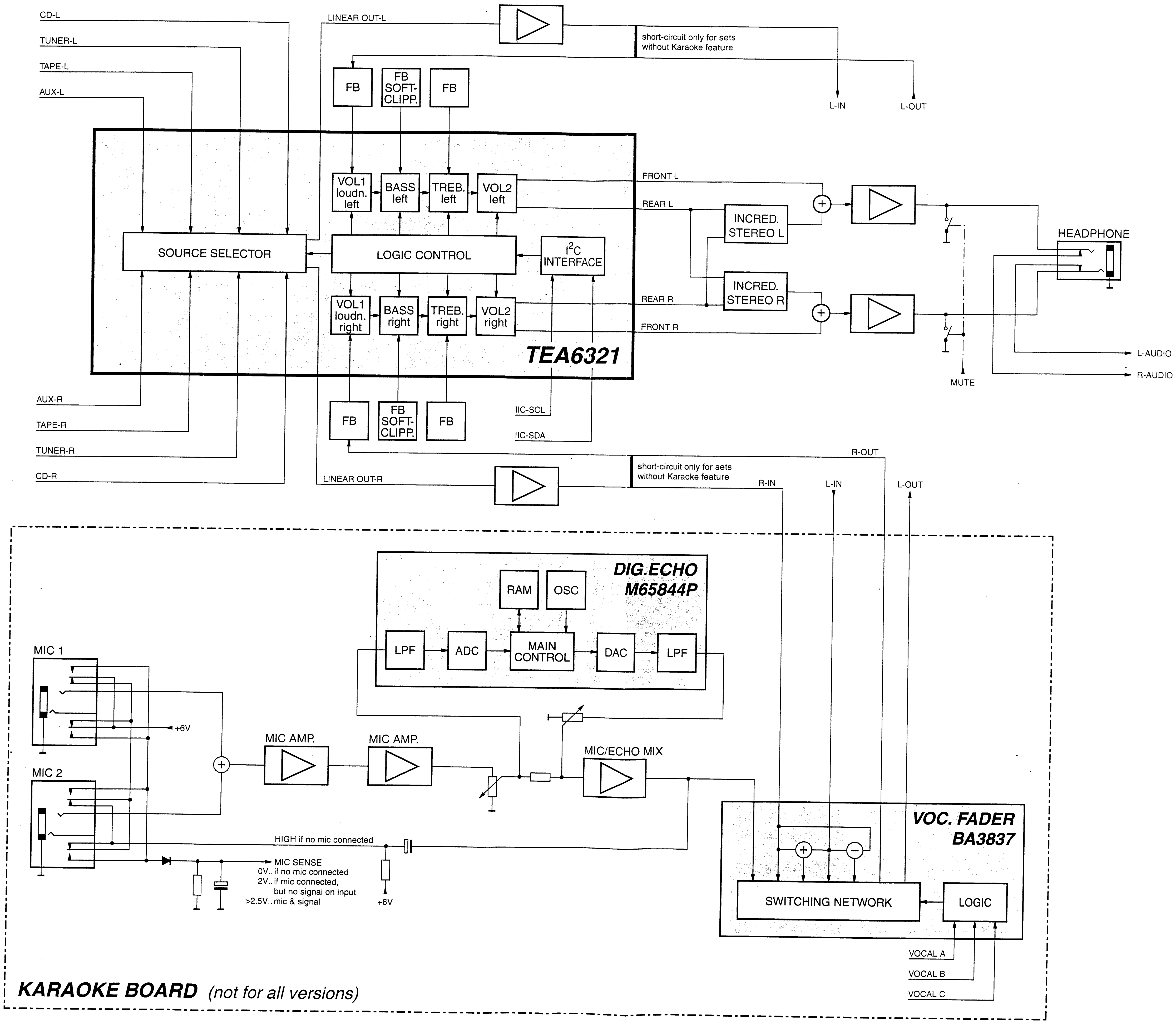

REC LINE-IN
PLAY BACK DECK A
REC/PB DECK B
12
13
erase head
ERASE OSC. BIAS GEN.
BIAS LEVEL
BIAS SYMM.
S3
S2
S4
S1
S0
SELECTOR HEF4952
REC EQUALIZ.
PB EQUALIZ.
FILTER
PB-LEVEL DECK A
PB-LEVEL DECK B
DECK A
DECK B
PB-IN
REC-IN
REC
PB
OFF
ON
LINE-OUT
SIDE CHAIN
DETECT.
DOLBY NR CXA1101M
Vref
REC-LEVEL
REC-OUT
TAPE
10
11
MOTOR
MOTOR DRIVER
TAPE SPEED HS / NS
HS
SPEED REGULAT.
M
SOL-B
SOLENOID DRIVER
solenoid deck B
EOT-B
VCC-B
hall-IC deck B
SOL-A
SOLENOID DRIVER
solenoid deck A
EOT-A
VCC-A
hall-IC deck A
COMMON
REC.FWD
REC.RVS
TAPE-B
MODE-B
CRO2-B
COMMON
TAPE-A
MODE-A
CRO2-A
COMBI BOARD Tape logic / µP part

Mode	S0	S1	S2	S3	S4
STOP	0	1	0	0	1
PB deck A	1	0	0	0	1
PB deck B	0	0	1	0	1
REC (line)	0	1	0	1	0
DUBBING	1	0	0	1	0

FUNCTIONAL DIAGRAM CD-PART


DISC
Turntable motor
Track servo
Focus servo
Slide servo
ALPC
+5V
Laser
turntable
inner switch
pick up unit
slide motor
PHOTO DIODE ARRAY
D1
D2
D3
R1
R2
Track
Focus
CD - Drive
CDM 12.1
Flex pcb
Focus, Track, D1-D3, R1,R2
CD INTERFACE BOARD see Chapter 10
COMBI BOARD see Chapter 9
7804
6x Inverter
HF- Pre amplifier
PC74HCU04N
HF (Eye Pattern)
1
7860
SAA7345
SIGNAL PROCESSOR CD6
PLL FRONTEND
DIGITAL PLL
EFM DEMODULATOR
MOTOR CONTROL
ERROR CORRECTOR
FLAGS
SUBCODE
SRAM
RAM ADDRESSER
TIMING
AUDIO PROCESSOR
EBU INTERFACE
MICROPROCESSOR INTERFACE
Q-CHANNEL CRC CHECK
Q-CHANNEL REGISTER
PEAK DETECT
VERSATILE PINS INTERFACE
KILL
SERIAL DATA INTERFACE
RESET
To Motor Driver 7852
16,93MHz OSC.
SUPPLY FOR TDA1311
+10V
7871 (TDA1311)
CLK
WS
DATA
SERIAL DATA INTERFACE
D/A
D/A
DAC
CD Left
CD Right
7820
Laser on/off
7850
DIGITAL SERVOPROCESSOR
µP Interface
CLK 16,9MHz
OTD
OTD = Off Track Detection (low active)
6 x Low pass
A/D Converter
CONTROL
Output Stage
3 x Low pass
DSIC2 TDA1301T
D4
RESET
SLIDE
FOCUS
TRACK
7690
I/O PORT
I/O PORT
µP
TMP879971F
µP used for other functions too
7801
MOTOR DRIVER
TDA7073A
FOCUS +
FOCUS -
TRACK +
TRACK -
6
3
4
FOCUS
TRACK
7800
MOTOR DRIVER
TDA7073A
SLIDE +
SLIDE -
DISC MOTOR +
DISC MOTOR -
2
5
SLIDE
From Signal processor Motor control
7862
MOTOR DRIVER
TDA7073A
TRAY MOTOR
CAM MOTOR
M
TRAY MOTOR
POSITION MOTOR

FUNCTIONAL DIAGRAM AF-PART


CD-L
TUNER-L
TAPE-L
AUX-L
LINEAR OUT-L
short-circuit only for sets without Karaoke feature
L-IN
L-OUT
FB
FB SOFT-CLIPP.
FB
VOL1 loudn. left
BASS left
TREB. left
VOL2 left
SOURCE SELECTOR
LOGIC CONTROL
I²C INTERFACE
VOL1 loudn. right
BASS right
TREB. right
VOL2 right
TEA6321
FRONT L
REAR L
INCRED. STEREO L
INCRED. STEREO R
REAR R
FRONT R
HEADPHONE
L-AUDIO
R-AUDIO
MUTE
AUX-R
TAPE-R
TUNER-R
CD-R
FB
FB SOFT-CLIPP.
FB
IIC-SCL
IIC-SDA
R-OUT
LINEAR OUT-R
short-circuit only for sets without Karaoke feature
R-IN
L-IN
L-OUT
DIG.ECHO M65844P
RAM
OSC
LPF
ADC
MAIN CONTROL
DAC
LPF
MIC 1
+6V
MIC 2
MIC AMP.
MIC AMP.
MIC/ECHO MIX
HIGH if no mic connected
MIC SENSE
0V..if no mic connected
2V..if mic connected, but no signal on input
>2.5V..mic & signal
+6V
VOC. FADER BA3837
SWITCHING NETWORK
LOGIC
VOCAL A
VOCAL B
VOCAL C
KARAOKE BOARD (not for all versions)

General

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST MOTOR SPEED						
HIGH SPEED	SBC420 (4822 397 30071) 3150Hz	DUBBING	10 or 11 LEFT RIGHT	frequency counter	3682	5670Hz ±0.5%
NORMAL SPEED		PLAY			3684	3150Hz ±0.5%
CHECK WOW & FLUTTER (DECK1 AND DECK2)						
WOW & FLUTTER	SBC420 (4822 397 30071) 3150Hz	PLAY	10 or 11 LEFT RIGHT	W&F-meter	check only	≤0.35% unwtd.
ADJUST AZIMUTH (DECK1 AND DECK2)						
NORM. DIRECTION	SBC420 (4822 397 30071) 10kHz	PLAY FWD	10 & 11 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
REV. DIRECTION		PLAY REV			right hand screw	

Playback

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST PLAYBACK LEVEL						
DECK1	DOLBY REF. (4822 397 30071) 200nWb/m	PLAY	10 & 11 LEFT RIGHT	mV-meter	3635(L), 3636(R)	535mV ±0.5dB
DECK2					3641(L), 3642(R)	
CHECK PLAYBACK FREQUENCY RESPONSE (DECK1 AND DECK2)						
PB FREQU. RESP.	SBC420 (4822 397 30071)	PLAY	10 & 11 LEFT RIGHT	mV-meter	check only	limits see fig.1

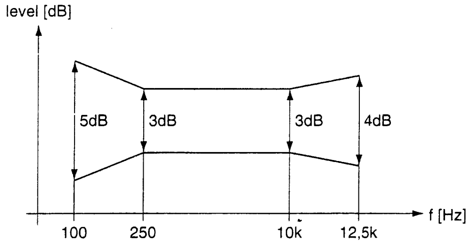


fig.1

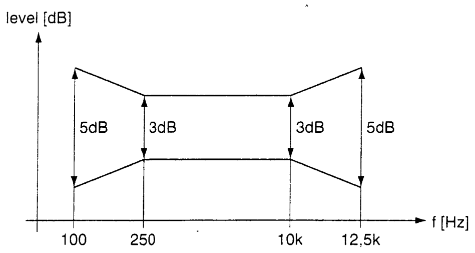
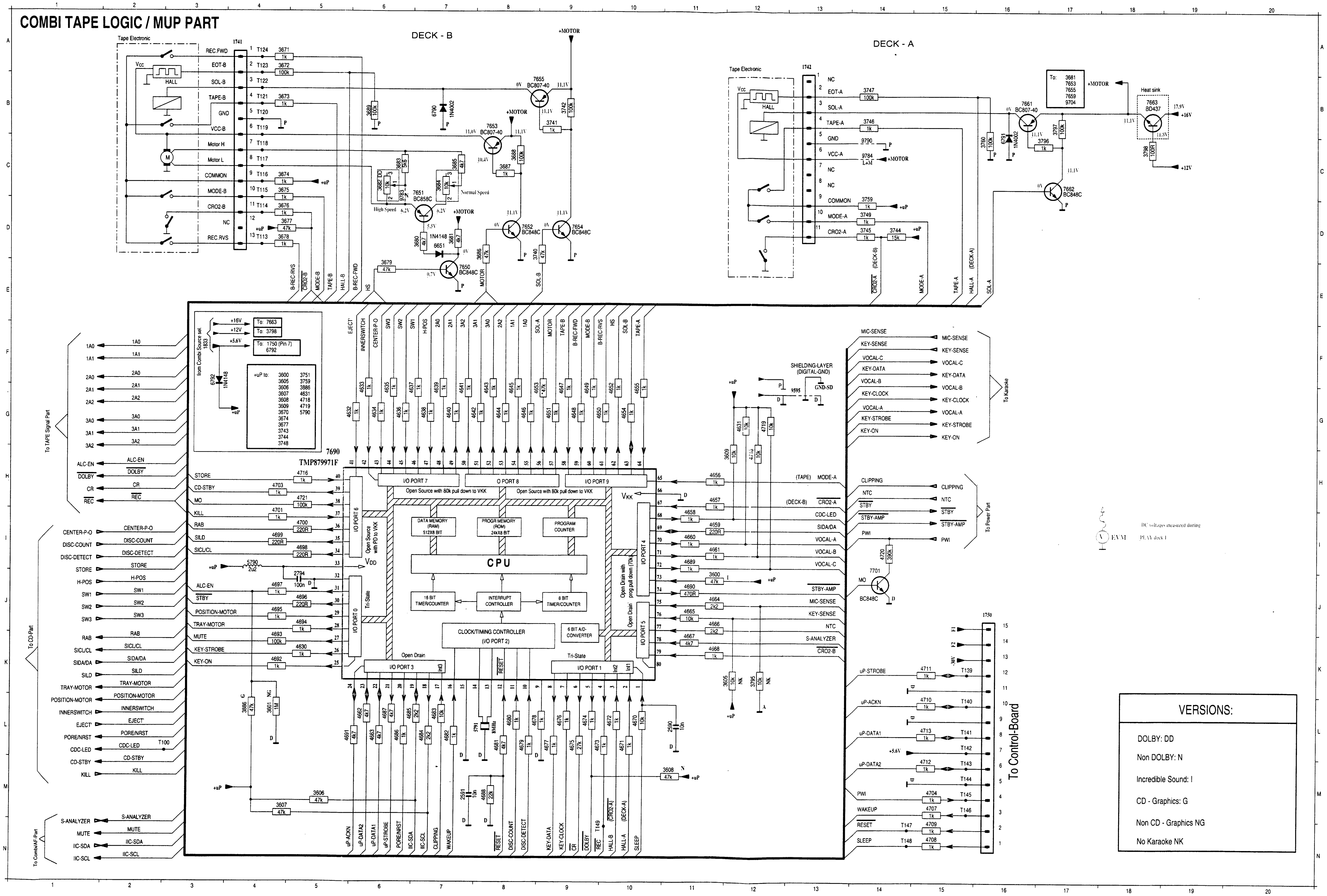


fig.2

Record

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
PRE-ADJUST BIAS AND BIAS-SYMMETRY						
CrO$_2$	CrO$_2$	RECORD	12 & 13 LEFT RIGHT	mV-meter	3773 & 3785	110mV & left=right
FERRO	FERRO	RECORD			check only	71mV ±0.5dB
CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION						
37mV at AUX-IN, 100Hz,250Hz,1kHz, 10kHz,12.5kHz	CrO$_2$	RECORD				
	RECORDED CASSETTE	PLAY	10 & 11 LEFT RIGHT	mV-meter	check only	limits see fig.2
100mV at AUX-IN, 1kHz	CrO$_2$	RECORD				
	RECORDED CASSETTE	PLAY	10 & 11 LEFT RIGHT	THD-meter	check only	≤3%
Remark: If high frequencies are not within limits, decrease bias and remeasure. If distortion is too high increase bias and remeasure.						
ADJUST RECORD LEVEL						
AUX-IN	CrO$_2$	RECORD	10 & 11 LEFT RIGHT	mV-meter	LF-generator	330Hz 170mV
	CrO$_2$	RECORD	12 & 13 LEFT RIGHT	mV-meter	3655 & 3556	5mV [1]
[1] Remark: Use low pass filter to attenuate the bias component, or short-circuit base of 7783 to ground.						
RECORD LEVEL						
	RECORDED CASSETTE	PLAY	10 & 11 LEFT RIGHT	mV-meter	check only	330Hz 170mV ±0.5dB
Remark: If measured value is out of limit, re-adjust record level and remeasure.						

COMBI TAPE LOGIC / MUP PART


DECK - B
DECK - A
Tape Electronic
Vcc
HALL
REC.FWD
EOT-B
SOL-B
TAPE-B
GND
VCC-B
Motor H
Motor L
COMMON
MODE-B
CRO2-B
NC
REC.RVS
1741
1742
T124
T123
T122
T121
T120
T119
T118
T117
T116
T115
T114
T113
3671 1k
3672 100k
3673 1k
3674 1k
3675 1k
3676 1k
3677 47k
3678 1k
+uP
+MOTOR
7655 BC807-40
7653 BC807-40
7651 BC858C
7650 BC848C
7652 BC848C
7654 BC848C
6790 1N4002
6651 1N4148
High Speed
Normal Speed
3679 47k
B-REC-RVS
CRO2-B
MODE-B
TAPE-B
HALL-B
B-REC-FWD
HS
MOTOR
SOL-B
NC
EOT-A
SOL-A
TAPE-A
GND
VCC-A
COMMON
MODE-A
CRO2-A
3747 100k
3746 1k
9784 L+M
3759 1k
3749 1k
3745 1k
3744 15k
7661 BC807-40
6791 1N4002
7662 BC848C
7663 BD437
Heat sink
3796 1k
3797 100k
3798 100R
3760 100k
To: 3681 7653 7655 7659 9704
+16V
+12V
(DECK-B)
(DECK-A)
HALL-A
7690
TMP87997IF
from Combi Source sel 1833
To: 7663
To: 3798
To: 1750 (Pin 7) 6792
+uP to: 3600 3605 3606 3607 3608 3609 3670 3674 3677 3743 3744 3748 3751 3759 3886 4631 4718 4719 5790
6792 1N4148
EJECT
INNERSWITCH
CENTER-P-O
SW3
SW2
SW1
H-POS
2A0
2A1
3A2
3A1
3A0
2A2
1A1
1A0
SOL-A
MOTOR
TAPE-B
B-REC-FWD
MODE-B
B-REC-RVS
HS
SOL-B
TAPE-A
I/O PORT 7
I/O PORT 8
I/O PORT 9
Open Source with 80k pull down to VKK
VKK
DATA MEMORY (RAM) 512X8 BIT
PROGR MEMORY (ROM) 24KX8 BIT
PROGRAM COUNTER
CPU
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
6 BIT A/D-CONVERTER
I/O PORT 6
I/O PORT 0
I/O PORT 3
I/O PORT 1
I/O PORT 4
I/O PORT 5
Open Source with PD to VKK
VDD
Tri-State
Open Drain
Open Drain with prog pull down (70k)
STORE
CD-STBY
MO
KILL
RAB
SILD
SICL/CL
ALC-EN
STBY
POSITION-MOTOR
TRAY-MOTOR
MUTE
KEY-STROBE
KEY-ON
To TAPE Signal Part
DOLBY
CR
REC
To CD-Part
CENTER-P-O
DISC-COUNT
DISC-DETECT
H-POS
SW1
SW2
SW3
SIDA/DA
SILD
PORE/NRST
CDC-LED
T100
To Combi/AF Part
S-ANALYZER
IIC-SDA
IIC-SCL
5790 2u2
2794 100n
3886 G 47k
3601 NC 1M
3606 47k
3607 47k
2591 10n
4688 22k
5791 8MHz
2590 10n
3608 47k
uP-ACKN
uP-DATA1
uP-STROBE
IIC-SDA
IIC-SCL
CLIPPING
WAKEUP
RESET
DISC-COUNT
DISC-DETECT
KEY-DATA
KEY-CLOCK
CR
DOLBY
REC
T149
HALL-B
HALL-A
SLEEP
MIC-SENSE
KEY-SENSE
VOCAL-C
KEY-DATA
VOCAL-B
KEY-CLOCK
VOCAL-A
KEY-STROBE
KEY-ON
To Karaoke
SHIELDING-LAYER (DIGITAL-GND)
GND-SD
9595
(TAPE) MODE-A
(DECK-B) CRO2-A
CDC-LED
SIDA/DA
VOCAL-A
VOCAL-B
VOCAL-C
STBY-AMP
MIC-SENSE
KEY-SENSE
NTC
S-ANALYZER
CRO2-B
CLIPPING
NTC
STBY
STBY-AMP
PWI
To Power Part
7701 BC848C
4720 390k
3605 10k NK
3795 10k NK
3609 10k
4631 10k
4718 10k
4719 10k
3600 47k
1750
uP-STROBE
uP-ACKN
uP-DATA1
uP-DATA2
PWI
WAKEUP
RESET
SLEEP
T139
T140
T141
T142
T143
T144
T145
T146
T147
T148
+5.6V
To Control-Board
DC voltages measured during PLAY deck I
EVM

VERSIONS:

DOLBY: DD

Non DOLBY: N

Incredible Sound: I

CD - Graphics: G

Non CD - Graphics NG

No Karaoke NK

1741 A 4	9595 G13
1742 A13	9783 C 6
1750 J16	9784 C14
2590 L11	9790 C14
2591 M 7	T100 L 3
2794 J 5	T113 D 4
3600 J11	T114 D 4
3601 L 4	T115 C 4
3605 K12	T116 C 4
3606 M 5	T117 C 4
3607 M 4	T118 C 4
3608 M11	T119 B 4
3609 H12	T120 B 4
3671 A 4	T121 B 4
3672 A 4	T122 B 4
3673 B 4	T123 A 4
3674 C 4	T124 A 4
3675 C 4	T139 K15
3676 D 4	T140 L15
3677 D 4	T141 L15
3678 D 4	T142 L15
3679 E 6	T143 M15
3680 D 7	T144 M15
3681 D 7	T145 M15
3682 C 6	T146 M15
3683 C 6	T147 N14
3684 C 7	T148 N14
3685 C 7	T149 N 9
3686 D 8	
3687 C 8	
3688 C 8	
3689 B 6	
3740 D 8	
3741 B 9	
3742 B 9	
3744 D14	
3745 D14	
3746 B14	
3747 B14	
3749 D14	
3759 D14	
3760 C16	
3795 K12	
3796 C17	
3797 B17	
3798 C18	
3886 L 4	
4630 K 5	
4631 G12	
4632 G 5	
4633 G 6	
4634 G 6	
4635 G 6	
4636 G 6	
4637 G 6	
4638 G 7	
4639 G 7	
4640 G 7	
4641 G 7	
4642 G 7	
4643 G 8	
4644 G 8	
4645 G 8	
4646 G 8	
4647 G 9	
4648 G 9	
4649 G 9	
4650 G 9	
4651 G 9	
4652 G10	
4653 G 8	
4654 G10	
4655 G10	
4656 H11	
4657 H11	
4658 I11	
4659 I11	
4660 I11	
4661 I11	
4662 L 6	
4663 L 6	
4664 J11	
4665 J11	
4666 J11	
4667 K11	
4668 K11	
4670 L10	
4671 L10	
4672 L10	
4673 L 9	
4674 L 9	
4675 L 9	
4676 L 9	
4677 L 9	
4678 L 8	
4679 L 8	
4680 L 8	
4681 L 8	
4682 L 7	
4683 L 7	
4684 L 7	
4685 L 6	
4686 L 6	
4687 L 6	
4688 M 8	
4689 I11	
4690 J11	
4691 L 5	
4692 K 4	
4693 K 4	
4694 J 5	
4695 J 4	
4696 J 5	
4697 J 4	
4698 I 5	
4699 I 4	
4700 I 5	
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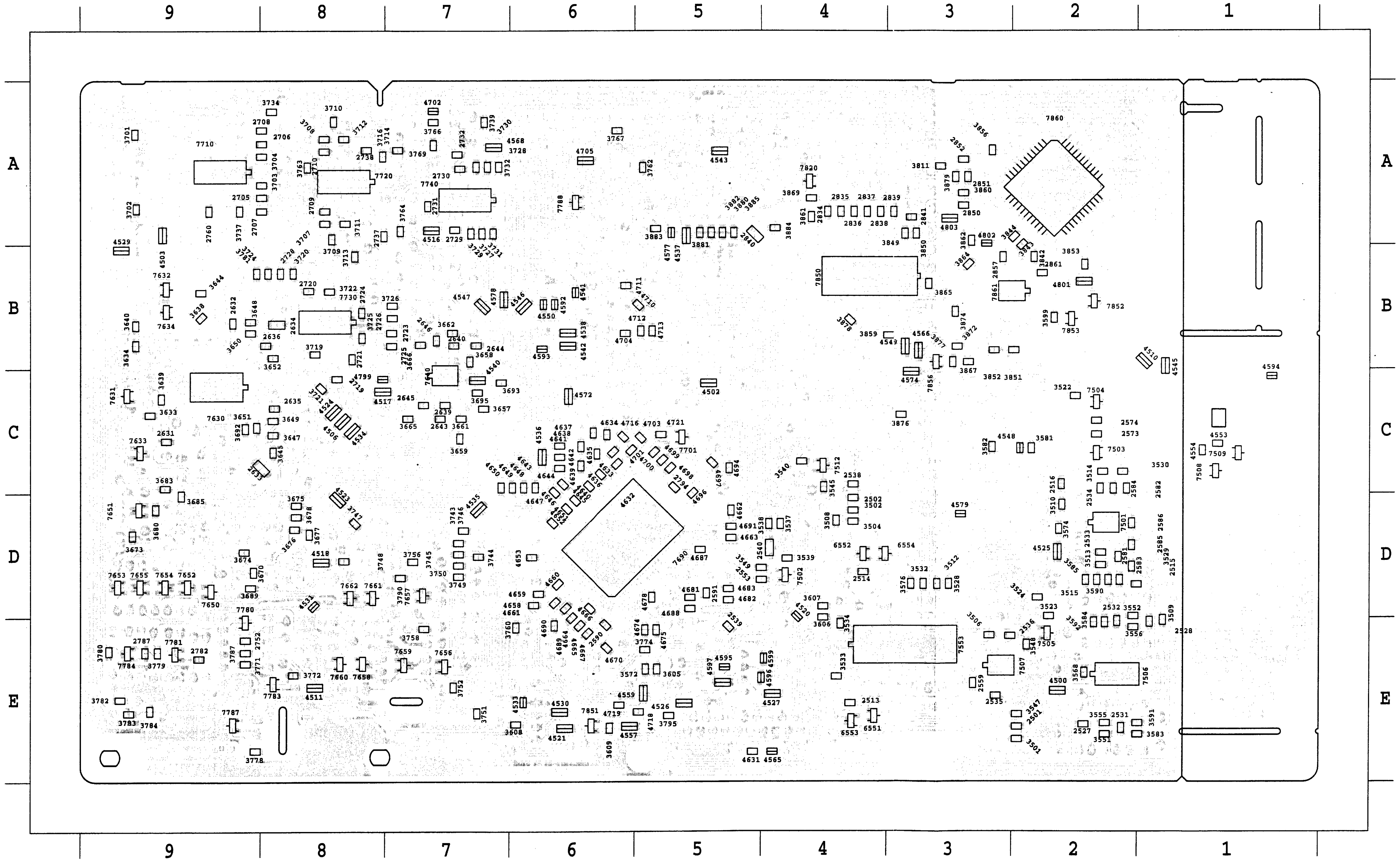

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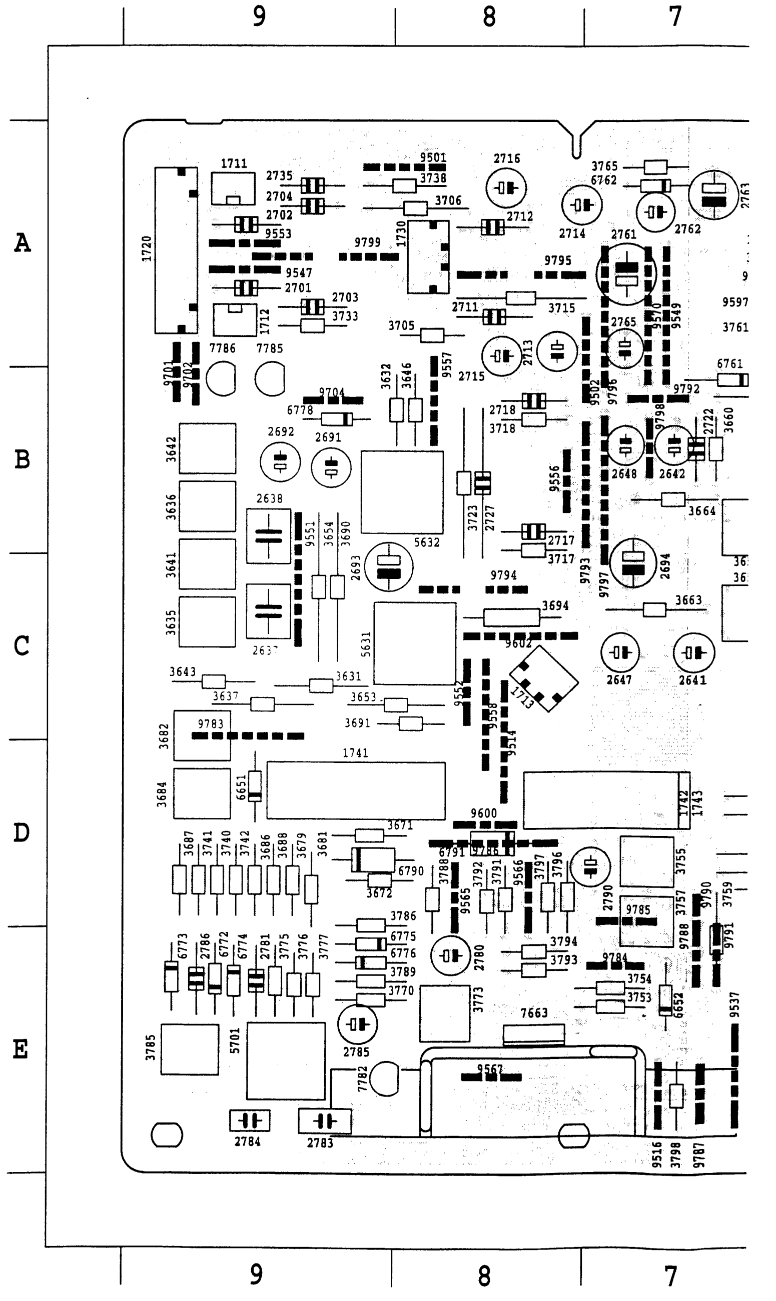

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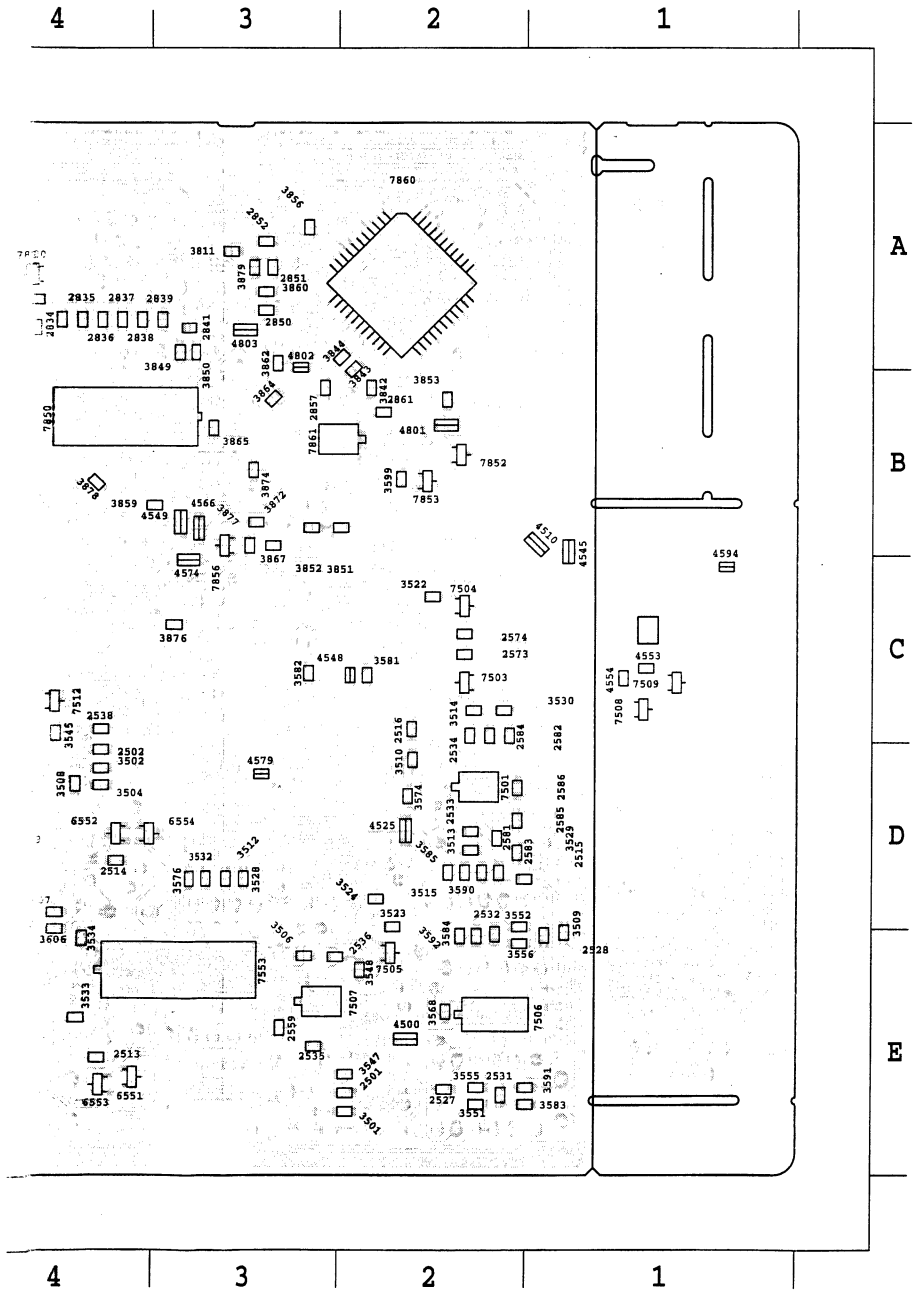

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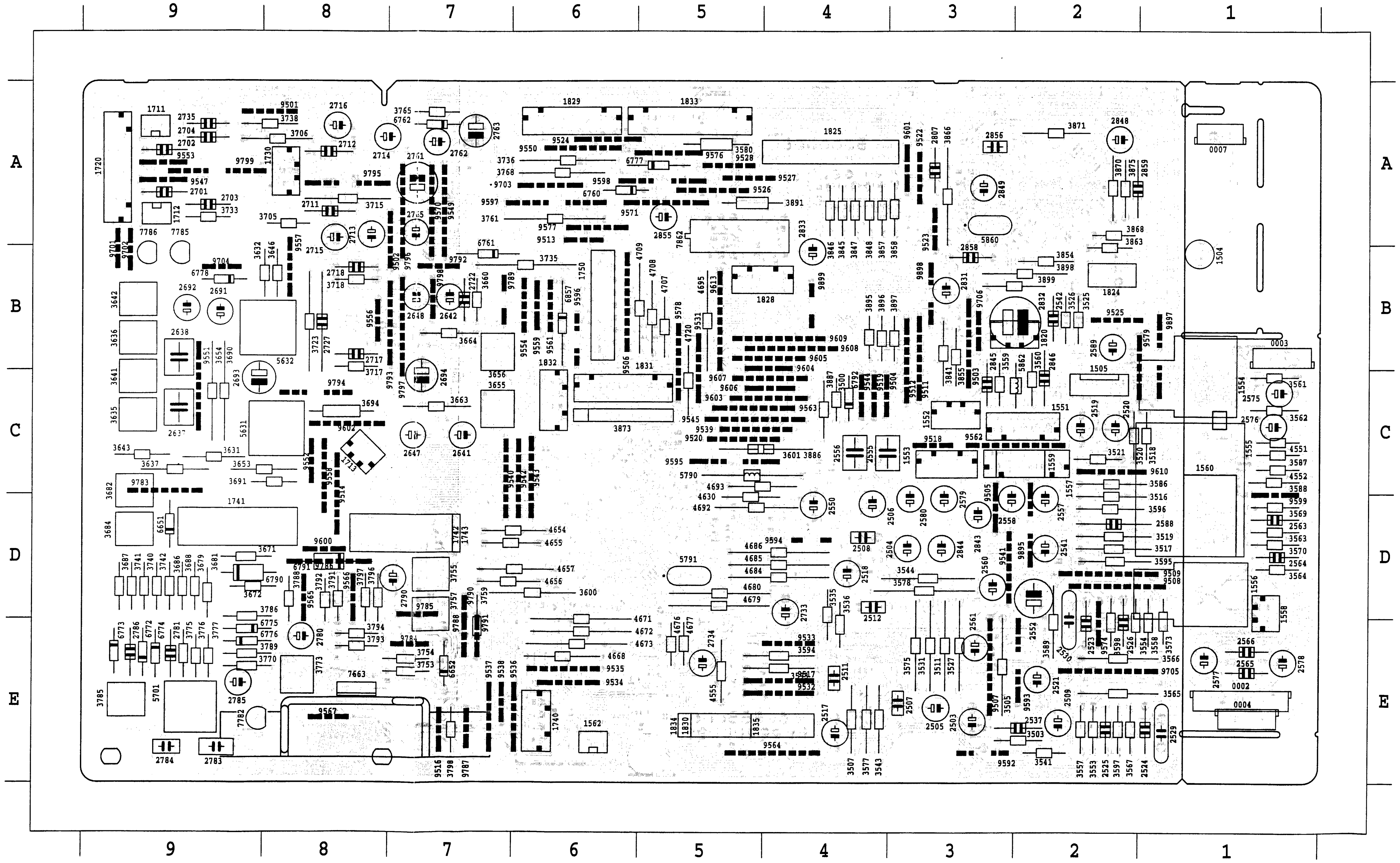

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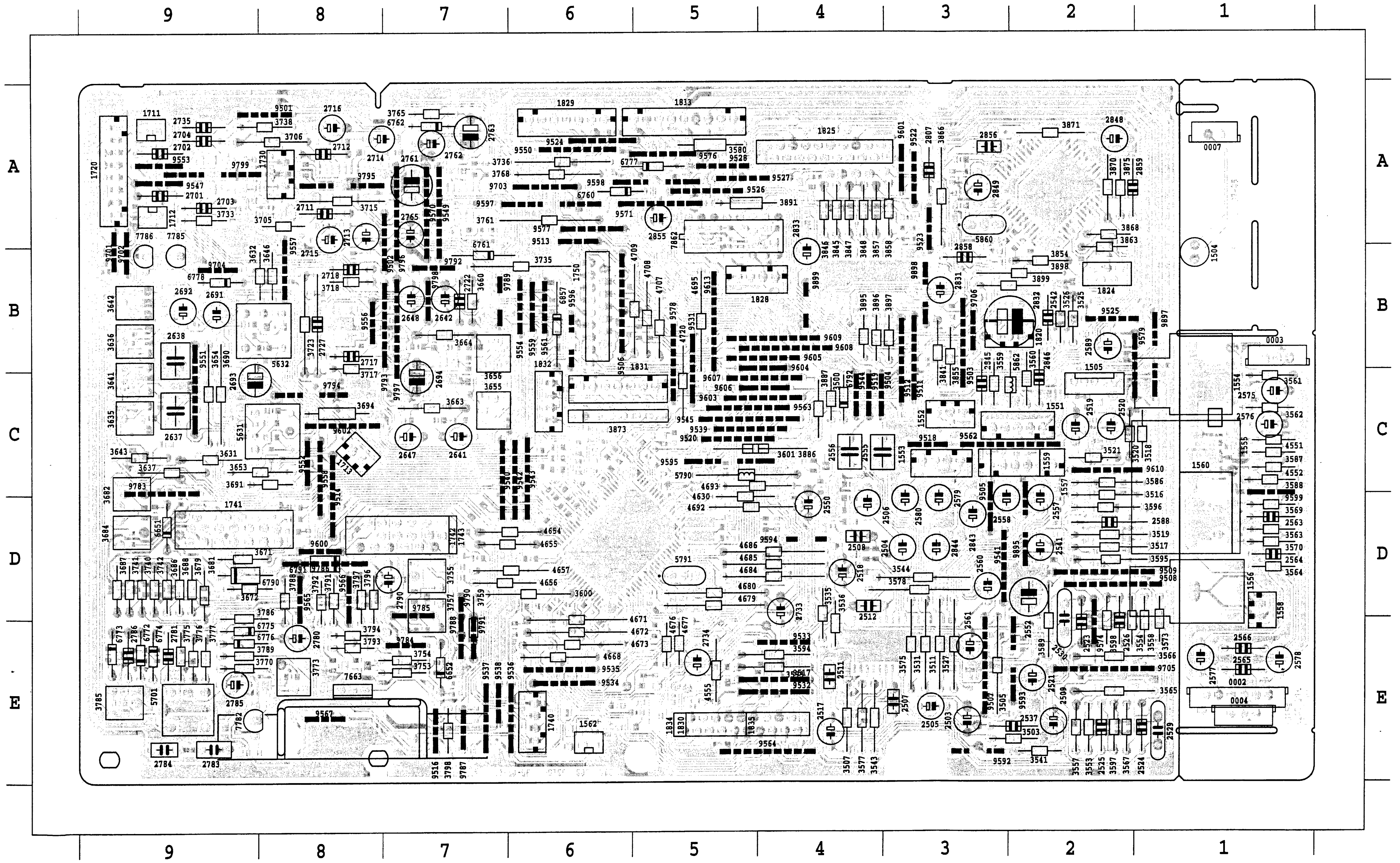

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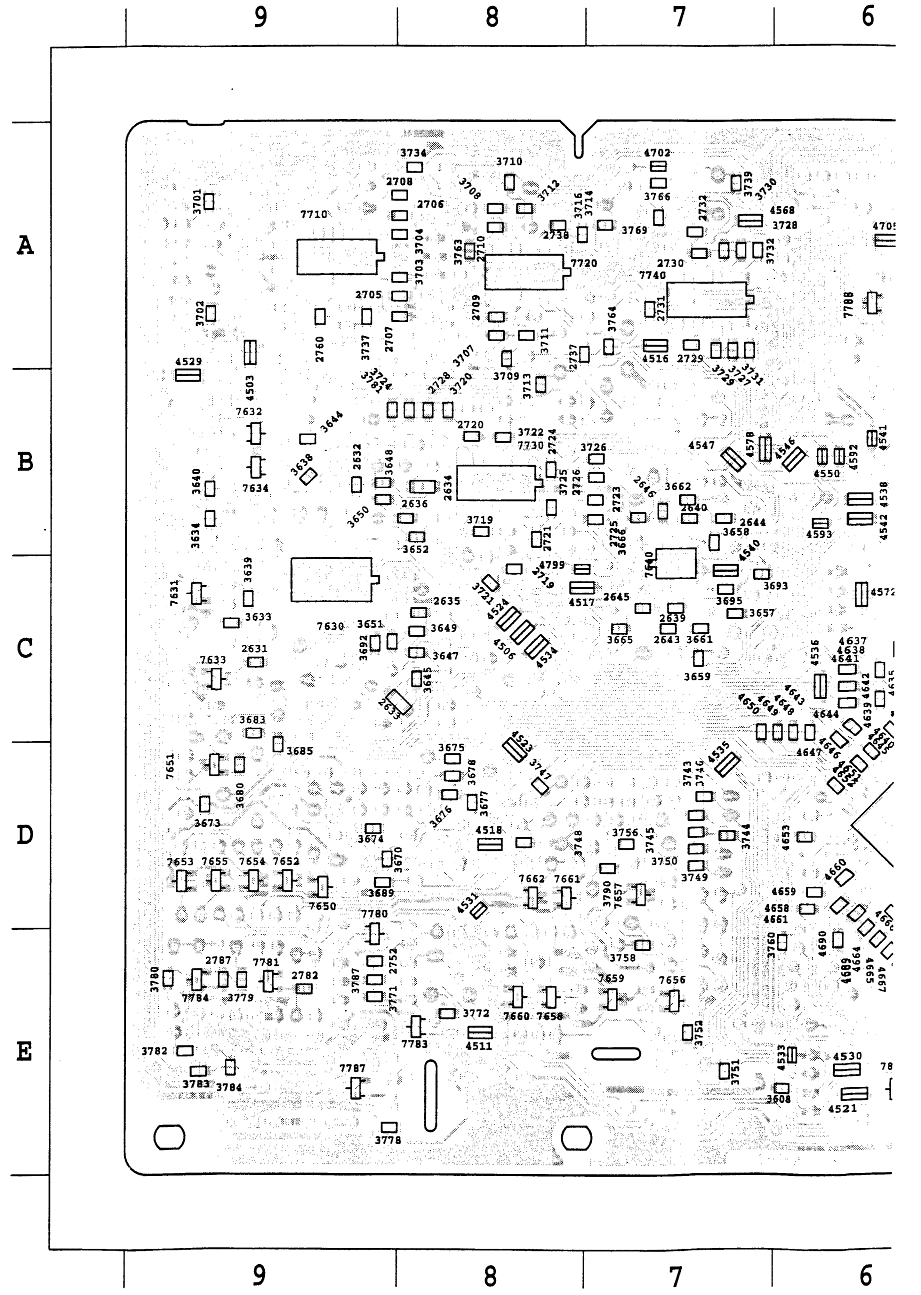

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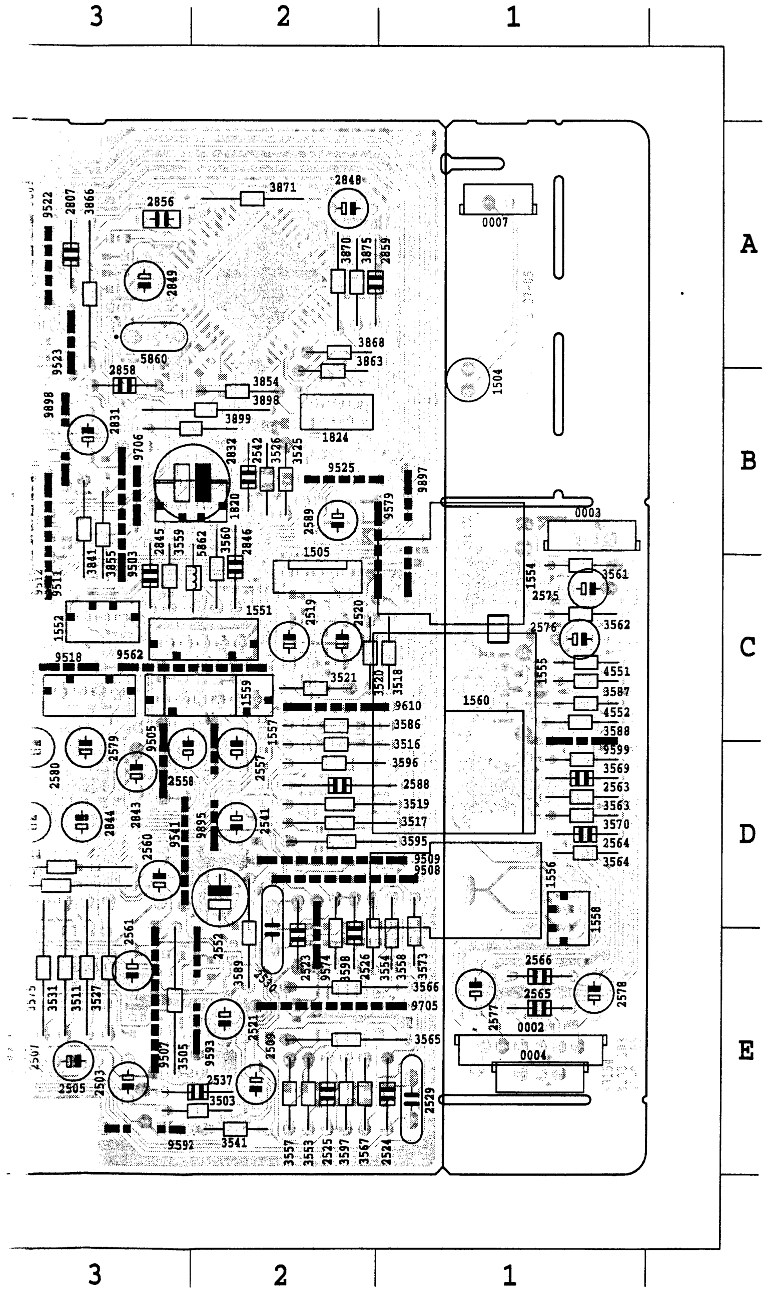

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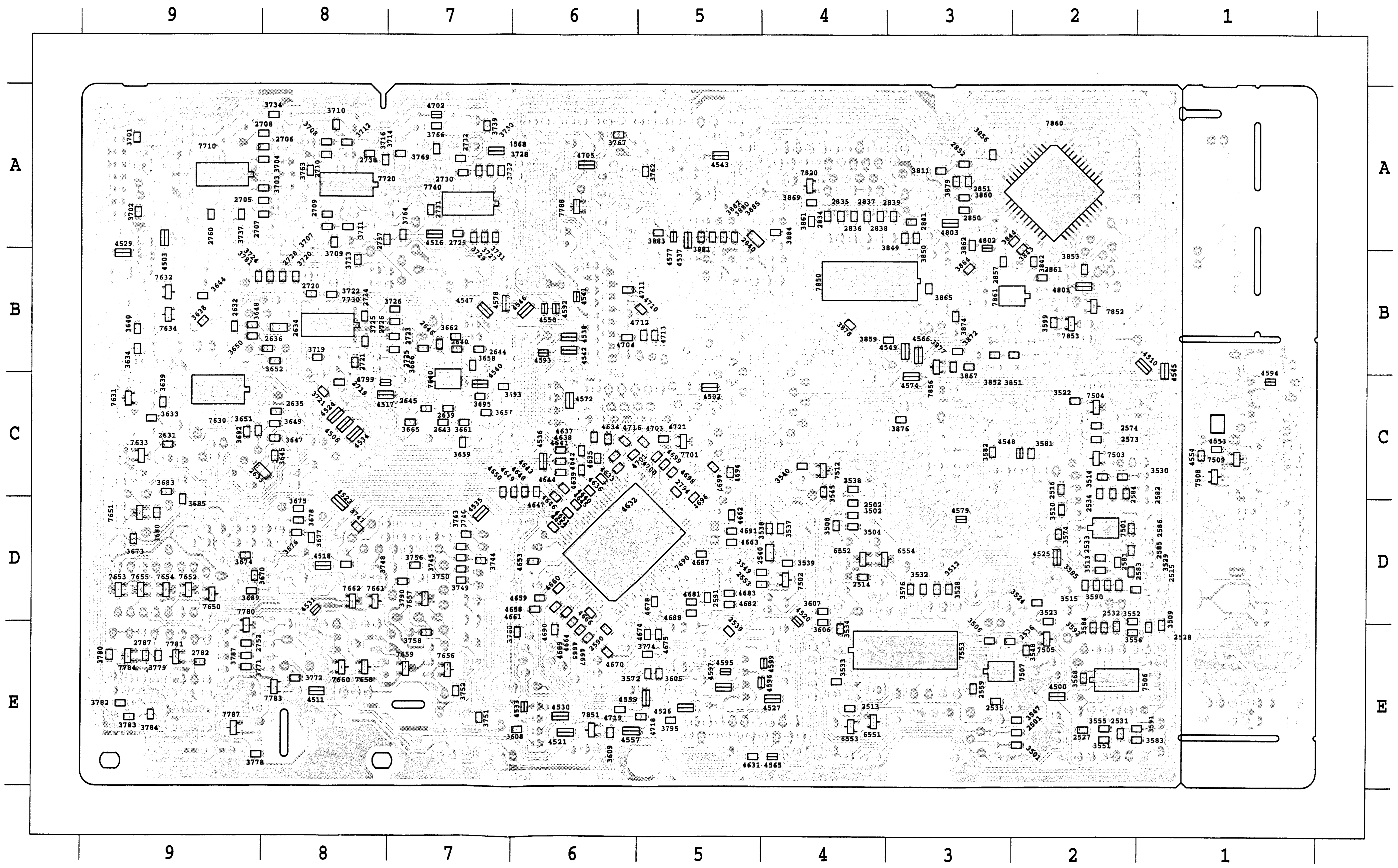

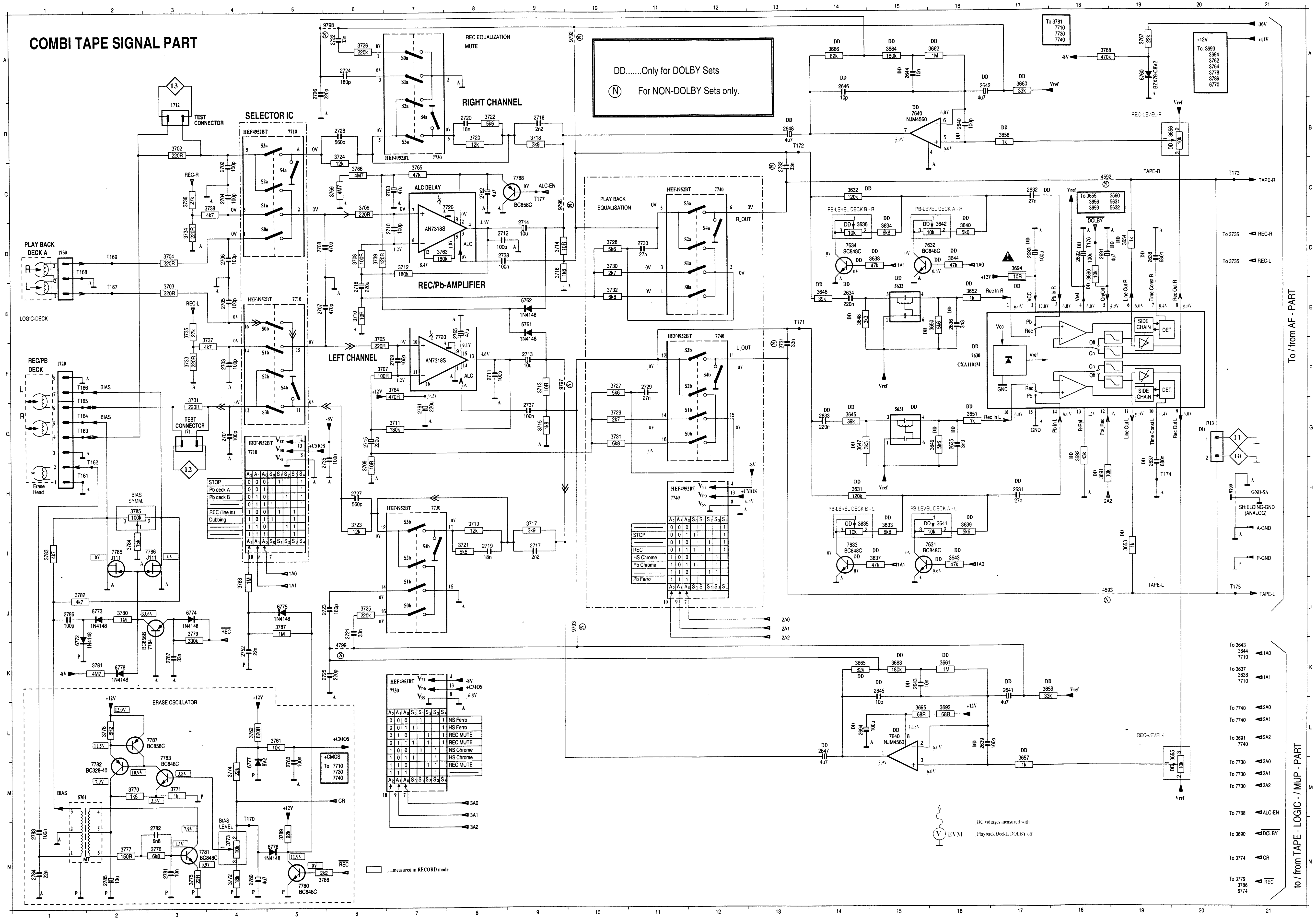
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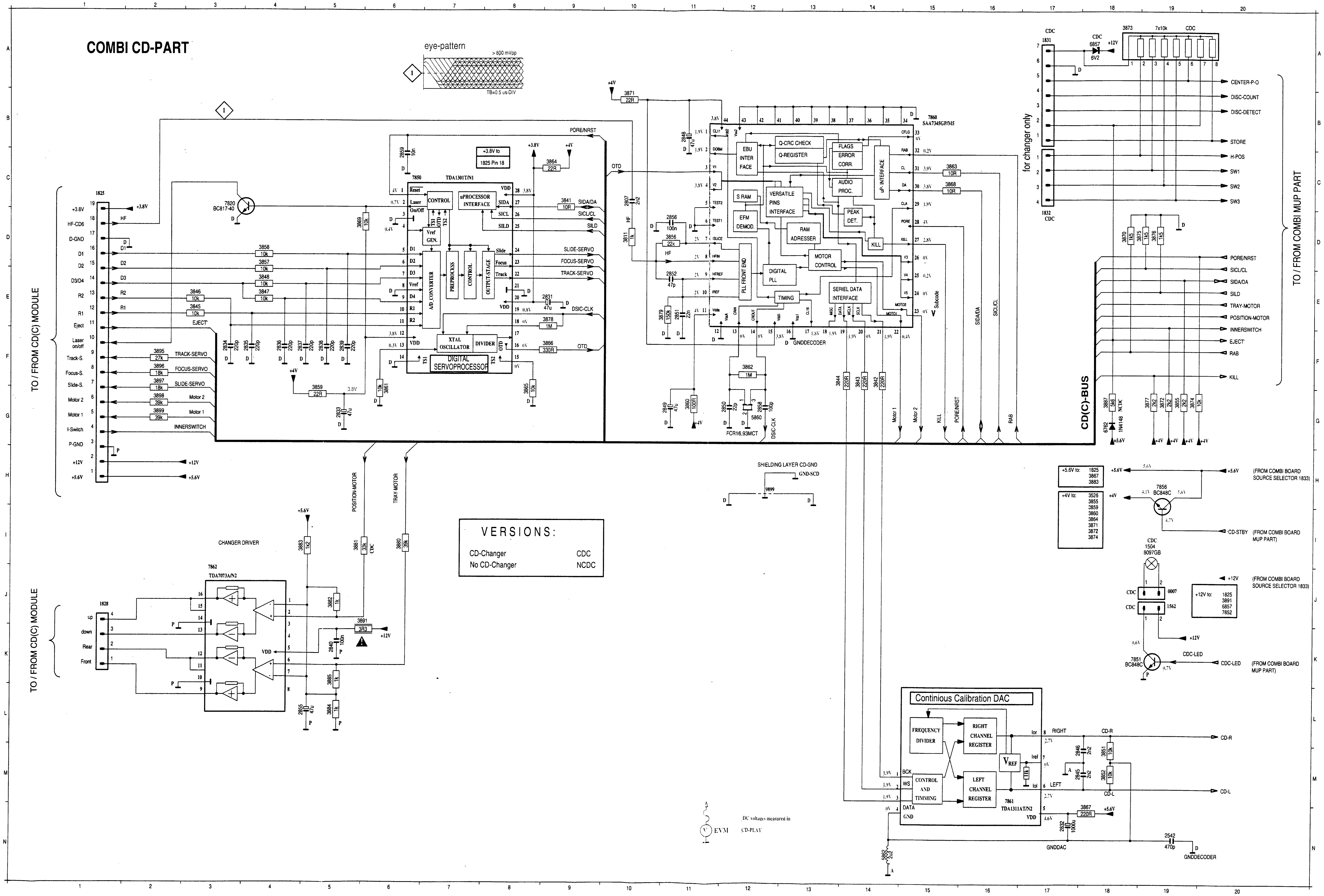
PB-LEVEL DECK A - R
PB-LEVEL DECK B - R
PB-LEVEL DECK A - L
PB-LEVEL DECK B - L
REC-LEVEL-R
REC-LEVEL-L
SIDE CHAIN
DET.
DOLBY
TAPE-R
TAPE-L
REC-R
REC-L
GND-SA
SHIELDING-GND (ANALOG)
A-GND
P-GND
STOP
Pb deck A
Pb deck B
REC (line in)
Dubbing
REC
HS Chrome
Pb Chrome
Pb Ferro
NS Ferro
HS Ferro
REC MUTE
NS Chrome
DC voltages measured with Playback Deck1, DOLBY off
...measured in RECORD mode
To / from AF - PART
to / from TAPE - LOGIC - / MUP - PART

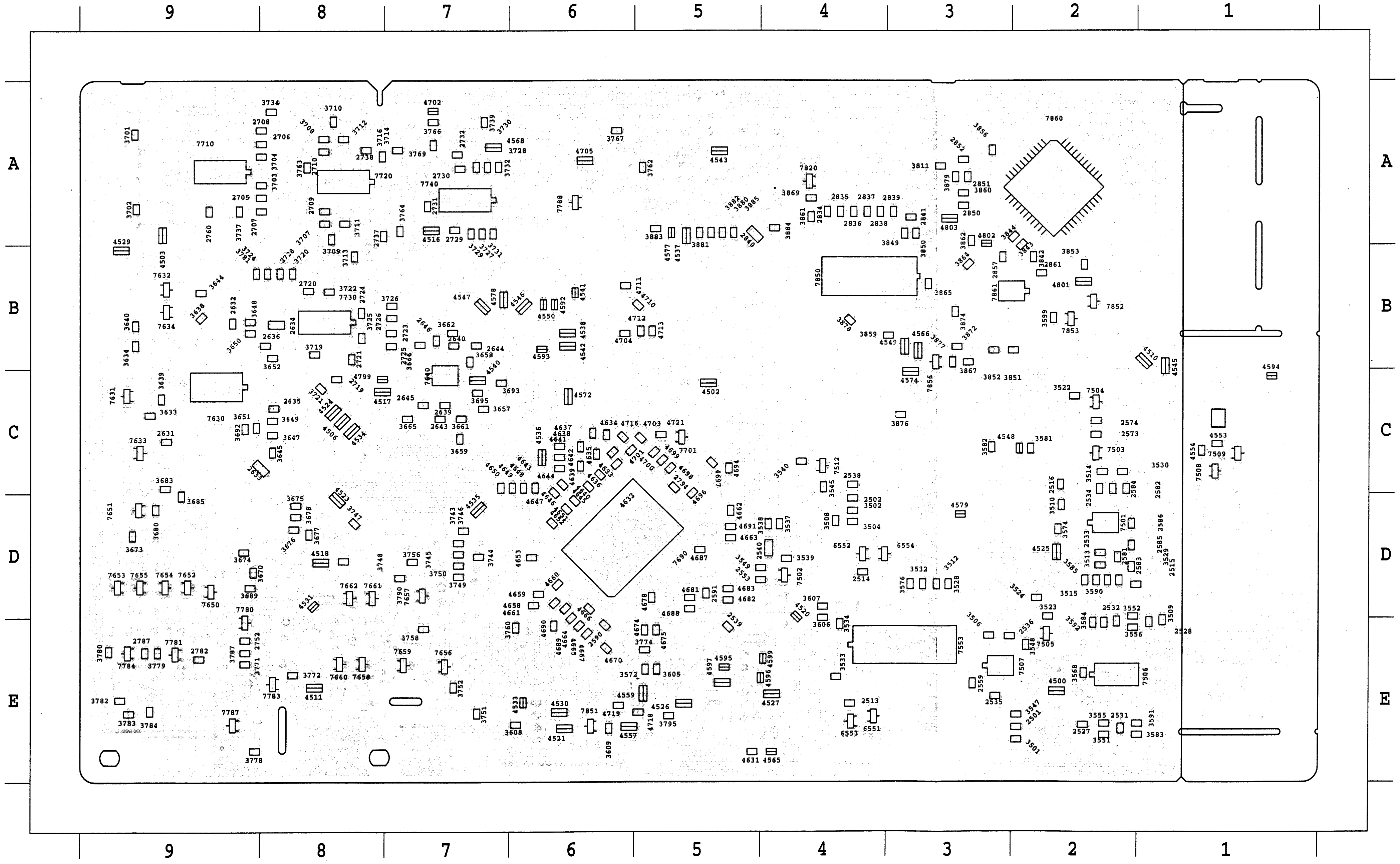
1711	G 3	3763	D 7
1712	B 3	3764	F 7
1713	G20	3765	C 7
1720	F 1	3766	C 6
1730	D 1	3767	A19
2631	H17	3768	A18
2632	C17	3769	C 6
2633	G14	3770	M 2
2634	E14	3771	M 3
2635	G16	3772	N 4
2636	E16	3773	N 4
2637	H19	3774	M 4
2638	D19	3775	N 3
2639	L16	3776	N 3
2640	B16	3777	N 2
2641	K17	3778	L 2
2642	A16	3779	J 3
2643	K15	3780	J 2
2644	A15	3781	K 2
2645	K15	3782	J 1
2646	A14	3783	I 1
2647	L14	3784	I 2
2648	B13	3785	H 2
2691	D18	3786	N 5
2692	D18	3787	J 5
2693	D17	3788	J 4
2694	L14	3789	N 5
2701	G 4	4592	C18
2702	C 4	4593	J18
2703	F 4	4799	K 6
2704	C 4	5631	G15
2705	E 4	5632	E15
2706	D 4	5701	M 1
2707	E 5	6760	A19
2708	D 5	6761	E 9
2709	F 7	6762	E 9
2710	D 7	6772	J 1
2711	F 8	6773	J 2
2712	D 8	6774	J 3
2713	F 9	6775	J 5
2714	D 9	6776	N 5
2715	G 6	6777	M 4
2716	E 6	6778	K 2
2717	I 9	7630	F16
2718	B 9	7631	I16
2719	I 8	7632	D16
2720	B 8	7633	I14
2721	J 6	7634	D14
2722	A 6	7640	L15
2723	J 5	7640	B15
2724	A 6	7710	B 5
2725	K 5	7710	E 5
2726	A 5	7710	G 4
2727	H 6	7720	C 7
2728	B 6	7720	E 7
2729	F11	7730	B 7
2730	D11	7730	H 7
2731	F13	7730	K 7
2732	C13	7740	C12
2735	H 5	7740	E12
2737	G 9	7740	H11
2738	D 8	7780	N 5
2752	K 4	7781	N 4
2760	M 5	7782	L 2
2761	G 7	7783	L 3
2762	C 8	7784	K 3
2763	C 6	7785	I 2
2765	E 8	7786	I 2
2780	N 4	7787	L 2
2781	N 3	7788	C 9
2782	N 3	9592	
2783	N 1	9593	
2784	N 1	9594	
2785	N 2	9597	
2786	J 1	9598	
2787	K 3	9789	
3631	H14	9792	A10
3632	C14	9793	J10
3633	I15	9794	
3634	D15	9795	
3635	I14	9796	C 9
3636	D14	9797	F 9
3637	I15	9798	A 6
3638	D15	9799	H21
3639	I16	9895	
3640	D16	9897	
3641	I16	T161	H 1
3642	D16	T162	G 2
3643	I16	T163	G 1
3644	D16	T164	G 1
3645	G14	T165	F 1
3646	E14	T166	F 1
3647	G14	T167	E 2
3648	E14	T168	D 1
3649	G16	T169	D 2
3650	E16	T170	M 4
3651	G16	T171	E13
3652	E16	T172	B13
3653	I19	T173	C21
3654	D19	T174	H19
3655	L19	T175	J21
3656	B19	T176	D18
3657	M17	T177	C 9
3658	B17		
3659	K17		
3660	A17		
3661	K16		
3662	A16		
3663	K15		
3664	A15		
3665	K14		
3666	A14		
3690	D18		
3691	H18		
3692	G18		
3693	L16		
3694	D17		
3695	L15		
3701	F 3		
3702	B 3		
3703	E 3		
3704	D 3		
3705	E 6		
3706	C 6		
3707	F 6		
3708	D 6		
3709	H 6		
3710	E 6		
3711	G 7		
3712	D 7		
3713	F 9		
3714	D 9		
3715	G 9		
3716	D 9		
3717	I 9		
3718	B 9		
3719	I 8		
3720	B 8		
3721	I 8		
3722	B 8		
3723	I 6		
3724	B 6		
3725	J 6		
3726	A 6		
3727	F10		
3728	D10		
3729	G10		
3730	D10		
3731	G10		
3732	E10		
3733	F 3		
3734	D 3		
3735	E 3		
3736	C 3		
3737	E 4		
3738	C 4		
3739	D 6		
3761	L 5		
3762	L 4		

COMBI CD-PART


eye-pattern
> 800 mVpp
TB=0.5 us/DIV
TO / FROM CD(C) MODULE
TO / FROM COMBI MUP PART
1825
+3.8V
HF-CD6
D-GND
D1
D2
D3/D4
R2
R1
Eject
Laser on/off
Track-S.
Focus-S.
Slide-S.
Motor 2
Motor 1
I-Switch
P-GND
+12V
+5.6V
7820 BC817-40
7850 TDA1301T/N1
uPROCESSOR INTERFACE
CONTROL
Vref GEN.
A/D_CONVERTER
PREPROCESS
CONTROL
OUTPUT-STAGE
XTAL OSCILLATOR
DIVIDER
DIGITAL SERVOPROCESSOR
+3.8V to 1825 Pin 18
PORE/NRST
SIDA/DA
SICL/CL
SILD
SLIDE-SERVO
FOCUS-SERVO
TRACK-SERVO
DSIC-CLK
OTD
TRACK-SERVO
FOCUS-SERVO
SLIDE-SERVO
INNERSWITCH
EJECT
7860 SAA7345GP/M5
EBU INTER FACE
Q-CRC CHECK
Q-REGISTER
FLAGS
ERROR CORR.
AUDIO PROC.
uP. INTERFACE
S RAM
VERSATILE PINS INTERFACE
EFM DEMOD.
RAM ADRESSER
PEAK DET.
KILL
MOTOR CONTROL
PLL FRONT END
DIGITAL PLL
TIMING
SERIEL DATA INTERFACE
GNDDECODER
FCR16,93MCT
DSIC-CLK
Motor 1
Motor 2
KILL
PORE/NRST
SIDA/DA
SICL/CL
RAB
CD(C)-BUS
for changer only
CDC 1831
CDC 1832
CDC 6857 6V2
3873 7x10k CDC
CENTER-P-O
DISC-COUNT
DISC-DETECT
STORE
H-POS
SW1
SW2
SW3
PORE/NRST
SICL/CL
SIDA/DA
SILD
TRAY-MOTOR
POSITION-MOTOR
INNERSWITCH
EJECT
RAB
KILL
SHIELDING LAYER CD-GND
GND-SCD
9899
POSITION-MOTOR
TRAY-MOTOR
CHANGER DRIVER
7862 TDA7073A/N2
1828
up
down
Rear
Front
VERSIONS:
CD-Changer CDC
No CD-Changer NCDC
+5.6V to: 1825 3867 3883
+4V to: 3526 3855 3859 3860 3864 3871 3872 3874
7856 BC848C
CD-STBY (FROM COMBI BOARD MUP PART)
+5.6V (FROM COMBI BOARD SOURCE SELECTOR 1833)
CDC 1504 8097GB
CDC 0007
CDC 1562
+12V (FROM COMBI BOARD SOURCE SELECTOR 1833)
+12V to: 1825 3891 6857 7852
7851 BC848C
CDC-LED
CDC-LED (FROM COMBI BOARD MUP PART)
Continious Calibration DAC
FREQUENCY DIVIDER
RIGHT CHANNEL REGISTER
LEFT CHANNEL REGISTER
CONTROL AND TIMMING
VREF
7861 TDA1311AT/N2
BCK
WS
DATA
GND
VDD
RIGHT
LEFT
CD-R
CD-L
GNDDAC
2542 470p
GNDDECODER
5862 2u2
EVM
DC voltages measured in CD-PLAY

0007	J19
1504	I19
1562	J19
1825	C 1
1828	J 1
1831	A17
1832	D17
2542	N19
2807	C10
2831	E 9
2832	N17
2833	G 5
2834	F 3
2835	F 4
2836	F 4
2837	F 4
2838	F 5
2839	F 5
2840	K 5
2845	M18
2846	M18
2848	B11
2849	G11
2850	G12
2851	E11
2852	E11
2855	L 5
2856	D11
2858	F13
2859	C 6
3811	D10
3841	C 9
3842	F14
3843	F14
3844	F13
3845	E 3
3846	E 3
3847	E 4
3848	E 4
3851	M18
3852	M18
3855	G19
3856	D11
3857	D 4
3858	D 4
3859	G 5
3860	G11
3861	G 6
3862	F12
3863	C15
3864	C 9
3865	G 8
3866	F 9
3867	N18
3868	C15
3869	D 5
3870	D18
3871	B10
3872	G19
3873	A18
3874	G19
3875	D18
3876	D19
3877	G19
3878	E 9
3879	E10
3880	I 6
3881	I 5
3882	J 5
3883	I 4
3884	L 5
3885	K 5
3887	D18
3891	J 6
3895	F 2
3896	F 2
3897	F 2
3898	G 2
3899	G 2
5860	G12
5862	N14
6857	A18
7820	C 3
7850	C 6
7851	K19
7856	H19
7860	B15
7861	M16
7862	J 3

2501 E 2	2586 D 2	2729 A 7	3504 D 4	3551 E 2	3639 C 9	3685 D 9	3729 A 7	3774 E 5	3869 A 4	4525 D 2	4559 E 5	4640 C 6	4674 E 5	4716 C 5	7631 C 9	7783 E 8	T015 A 5	T042 C 2	T074 C 3	T114 D 8	T143 B 6
2502 D 4	2631 C 9	2730 A 7	3506 E 3	3552 D 2	3640 B 9	3689 D 9	3730 A 7	3778 E 9	3872 B 3	4526 E 5	4561 E 5	4641 C 6	4675 E 5	4718 E 5	7632 B 9	7784 E 9	T016 A 5	T043 A 3	T076 C 3	T115 D 8	T144 A 6
2513 E 4	2632 B 9	2731 A 7	3508 D 4	3555 E 2	3644 B 9	3692 C 9	3731 A 7	3779 E 9	3874 B 3	4527 E 4	4565 E 4	4642 C 6	4678 D 5	4719 E 5	7633 C 9	7787 E 9	T018 A 3	T045 C 2	T078 A 5	T116 D 9	T145 B 6
2514 D 4	2633 C 8	2732 A 7	3509 E 1	3556 E 2	3645 C 8	3693 C 7	3732 A 7	3780 E 9	3876 C 3	4529 B 9	4566 B 3	4643 C 6	4681 D 5	4721 C 5	7634 B 9	7788 A 6	T019 A 4	T046 C 1	T079 C 3	T117 C 9	T146 B 6
2515 D 2	2634 B 8	2737 A 8	3510 D 2	3568 E 2	3647 C 8	3695 C 7	3734 A 8	3782 E 9	3877 B 3	4530 E 6	4568 A 7	4644 C 6	4682 D 5	4723 C 8	7640 C 7	7820 A 4	T020 B 2	T047 A 6	T080 D 3	T118 D 9	T147 D 5
2516 C 2	2635 C 8	2738 A 8	3512 D 3	3572 E 6	3648 B 9	3701 A 9	3737 A 9	3783 E 9	3878 B 4	4531 D 8	4572 C 6	4645 C 6	4683 D 5	4724 B 8	7650 D 9	7850 B 4	T021 B 2	T048 B 6	T081 C 2	T119 D 9	T148 E 5
2527 E 2	2636 B 8	2752 E 9	3513 D 2	3574 D 2	3649 C 8	3702 A 9	3743 D 7	3784 E 9	3879 A 3	4533 E 6	4574 C 3	4646 D 6	4687 D 5	4799 C 8	7651 D 9	7851 E 6	T022 B 2	T049 A 3	T082 C 3	T120 D 9	T149 E 7
2528 E 1	2639 C 7	2760 A 8	3514 C 2	3576 D 3	3650 B 9	3703 A 8	3744 D 7	3787 E 9	3880 A 5	4534 C 8	4577 A 5	4647 D 6	4688 D 5	4801 B 2	7652 D 9	7852 B 2	T023 A 2	T050 B 3	T083 E 6	T121 D 9	T161 B 9
2531 E 2	2640 B 7	2782 E 9	3515 D 2	3581 C 2	3651 C 9	3704 A 8	3745 D 7	3790 D 7	3881 A 5	4535 D 7	4578 B 7	4648 C 6	4689 D 6	4802 A 3	7653 D 9	7853 B 2	T024 B 5	T051 A 5	T084 E 5	T122 D 9	T162 E 9
2532 E 2	2643 C 7	2787 E 9	3522 C 2	3582 C 3	3652 B 8	3707 A 8	3746 D 7	3811 A 3	3882 A 5	4536 C 6	4579 D 3	4649 C 6	4690 E 6	4803 A 3	7654 D 9	7856 B 3	T025 B 5	T052 A 6	T085 E 6	T123 D 9	T163 A 9
2533 D 2	2644 B 7	2794 C 5	3523 D 2	3583 E 1	3657 C 7	3708 A 8	3747 D 8	3842 B 2	3883 A 5	4537 A 5	4592 A 6	4650 C 7	4691 D 5	6551 E 4	7655 D 9	7860 A 2	T026 B 4	T053 A 6	T086 E 5	T124 D 9	T164 A 9
2534 C 2	2645 C 7	2834 A 4	3524 D 2	3584 E 2	3658 B 7	3709 A 8	3748 D 8	3843 B 2	3884 A 4	4538 B 6	4593 B 6	4651 C 6	4694 C 5	6552 D 4	7656 E 7	7861 B 3	T027 A 4	T054 A 6	T087 E 6	T125 D 7	T165 A 9
2535 E 3	2646 B 7	2835 A 4	3528 D 3	3585 D 2	3659 C 7	3710 A 8	3749 D 7	3844 A 2	3885 A 5	4540 C 7	4594 C 1	4652 D 6	4696 D 5	6553 E 4	7657 D 7	T001 A 4	T028 B 3	T055 B 2	T088 E 4	T126 D 7	T166 B 9
2536 E 3	2705 A 8	2836 A 4	3529 D 2	3590 D 2	3661 C 7	3711 A 8	3750 D 7	3849 A 3	4500 E 2	4541 B 6	4595 E 5	4653 D 6	4697 C 5	6554 D 4	7658 E 8	T002 A 3	T029 B 2	T056 A 5	T089 E 6	T127 E 7	T167 A 8
2538 C 4	2706 A 8	2837 A 4	3530 C 2	3591 E 1	3662 B 7	3712 A 8	3751 E 7	3850 A 3	4502 C 5	4542 B 6	4596 E 4	4658 D 6	4698 C 5	7501 D 2	7659 E 7	T003 A 3	T030 B 2	T057 A 5	T090 E 4	T128 D 7	T168 A 8
2539 E 5	2707 A 8	2838 A 4	3532 D 3	3592 E 2	3665 C 7	3713 A 8	3752 E 7	3851 B 2	4503 A 9	4543 A 5	4597 E 5	4659 D 6	4699 C 5	7502 D 4	7660 E 8	T004 A 4	T031 C 6	T059 A 5	T091 E 6	T129 E 7	T169 A 8
2540 D 4	2708 A 8	2839 A 3	3533 E 4	3599 B 2	3666 B 7	3714 A 7	3756 D 7	3852 B 3	4506 C 8	4545 B 1	4599 E 4	4660 D 6	4700 C 5	7503 C 2	7661 D 8	T005 A 3	T032 B 3	T061 E 3	T092 E 4	T130 D 7	T170 E 8
2553 D 5	2709 A 8	2840 A 5	3534 E 4	3600 E 6	3670 D 9	3716 A 8	3758 E 7	3853 B 2	4510 B 1	4546 B 6	4631 E 5	4661 E 6	4701 C 5	7504 C 2	7662 D 8	T006 A 4	T033 C 6	T062 E 4	T093 E 1	T131 E 7	T171 A 7
2559 E 3	2710 A 8	2841 A 3	3537 D 4	3605 E 5	3673 D 9	3719 B 8	3760 E 6	3856 A 3	4511 E 8	4547 B 7	4632 C 6	4662 D 5	4702 A 7	7505 E 2	7690 D 6	T007 A 4	T034 C 5	T063 A 5	T094 E 1	T132 D 8	T172 B 7
2573 C 2	2719 C 8	2850 A 3	3538 D 4	3606 E 4	3674 D 9	3720 B 8	3762 A 5	3859 B 3	4516 A 7	4548 C 2	4633 C 6	4663 D 5	4703 C 5	7506 E 2	7701 C 5	T008 A 4	T035 C 5	T064 E 5	T095 C 1	T133 E 7	T173 C 9
2574 C 2	2720 B 8	2851 A 3	3539 D 4	3607 D 4	3675 D 8	3721 C 8	3763 A 8	3860 A 3	4517 C 8	4549 B 3	4634 C 6	4664 D 6	4704 B 6	7507 E 3	7710 A 9	T009 A 3	T036 C 5	T065 E 5	T096 C 1	T134 D 8	T174 B 9
2581 D 2	2721 B 8	2852 A 3	3540 C 4	3608 E 6	3676 D 8	3722 B 8	3764 A 7	3861 A 4	4518 D 8	4550 B 6	4635 C 6	4665 E 6	4705 A 6	7508 C 1	7720 A 8	T010 A 4	T037 C 5	T066 E 3	T097 D 1	T135 E 8	T175 C 8
2582 C 2	2723 B 7	2857 B 3	3545 C 4	3609 E 6	3677 D 8	3725 B 8	3767 A 6	3862 A 3	4520 D 4	4553 C 1	4636 C 6	4666 D 6	4710 B 5	7509 C 1	7730 B 8	T011 A 4	T038 C 6	T067 E 3	T098 D 1	T139 B 6	T176 C 9
2583 D 2	2724 B 8	2861 B 2	3547 E 2	3633 C 9	3678 D 8	3726 B 7	3769 A 7	3864 B 3	4521 E 6	4554 C 1	4637 C 6	4667 E 6	4711 B 6	7512 C 4	7740 A 7	T012 A 4	T039 C 6	T068 E 5	T099 E 1	T140 B 6	T177 B 5
2584 C 2	2725 B 7	3501 E 2	3548 E 2	3634 B 9	3680 D 9	3727 A 7	3771 E 9	3865 B 3	4523 D 8	4557 E 6	4638 C 6	4669 E 6	4712 B 5	7553 E 3	7780 E 9	T013 A 4	T040 C 6	T072 D 2	T100 E 6	T141 B 6	
2585 D 2	2726 B 7	3502 D 4	3549 D 5	3638 B 9	3683 C 9	3728 A 7	3772 E 8	3867 B 3	4524 C 8	4558 E 6	4639 C 6	4670 E 6	4713 B 5	7630 C 9	7781 E 9	T014 B 3	T041 C 6	T073 B 2	T113 D 8	T142 A 5	



9790 E 7	9605 B 4	9571 A 5	9545 C 5	9523 A 3	9501 A 8	5860 A 3
9791 E 7	9606 C 4	9574 E 2	9547 A 9	9524 A 6	9502 A 7	6651 D 9
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9793 B 7	9608 B 4	9577 A 6	9550 A 6	9526 A 5	9504 C 4	6760 A 6
9794 C 8	9609 B 4	9578 B 5	9551 C 9	9527 A 5	9505 D 3	6772 E 9
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9796 A 7	9613 B 5	9581 E 4	9553 A 9	9531 B 5	9507 E 3	6774 E 9
9797 B 7	9701 B 9	9592 E 3	9554 B 6	9532 E 4	9508 D 2	6775 E 9
9798 B 7	9702 B 9	9593 E 2	9556 B 8	9533 E 4	9509 D 2	6776 E 9
9799 A 9	9703 A 6	9594 D 4	9557 B 8	9534 E 6	9511 B 3	6777 A 5
9895 D 2	9704 B 9	9595 C 5	9558 C 8	9535 E 6	9512 B 3	6778 B 9
9896 C 2	9705 E 2	9596 B 6	9559 B 6	9536 E 6	9513 A 6	6790 D 9
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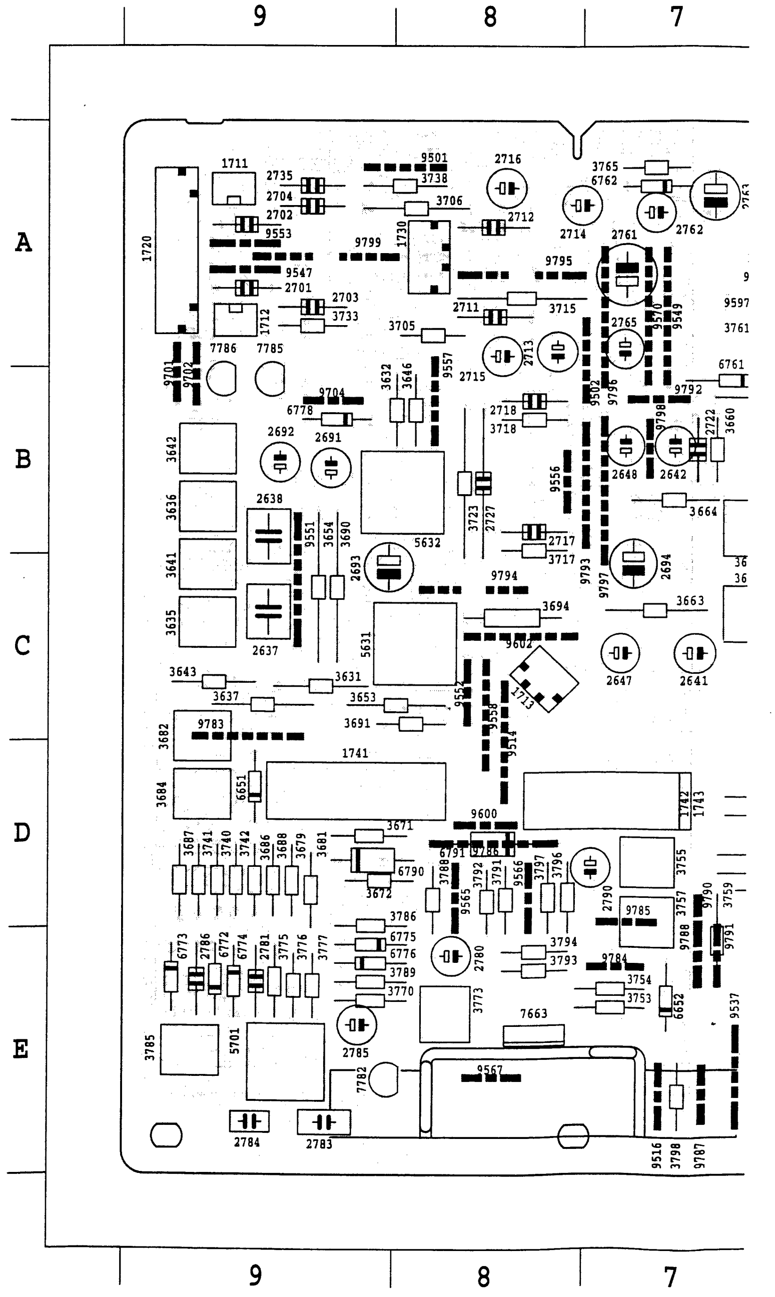
9898 B 3	9783 C 9	9598 A 5	9562 C 2	9538 E 7	9515 E 4	6792 C 4
9899 B 4	9784 E 7	9599 D 1	9563 C 5	9539 C 5	9516 E 7	6857 B 6
	9785 D 7	9600 D 8	9564 E 4	9540 C 7	9517 E 4	7663 E 8
	9786 D 8	9601 A 3	9565 D 8	9541 D 3	9518 C 3	7782 E 9
	9787 E 7	9602 C 8	9566 D 8	9542 C 6	9519 C 4	7785 B 9
	9788 E 7	9603 C 4	9567 E 8	9543 C 6	9520 C 5	7786 B 9
	9789 B 7	9604 B 4	9570 A 7	9544 C 4	9522 A 3	7862 A 5



74 E 5
75 E 5
78 D 5
81 D 5
82 D 5
83 D 5
87 D 5
88 D 5
89 D 6
90 E 6
91 D 5
94 C 5
96 D 5
97 C 5
98 C 5
99 C 5
00 C 5
01 C 5
02 A 7
03 C 5
04 B 6
05 A 6
10 B 5
11 B 6
12 B 5
13 B 5
4716 C 5
4718 E 5
4719 E 5
4721 C 5
4723 C 8
4724 B 8
4799 C 8
4801 B 2
4802 A 3
4803 A 3
6551 E 4
6552 D 4
6553 E 4
6554 D 4
7501 D 2
7502 D 4
7503 C 2
7504 C 2
7505 E 2
7506 E 2
7507 E 3
7508 C 1
7509 C 1
7512 C 4
7553 E 3
7630 C 9
7631 C 9
7632 B 9
7633 C 9
7634 B 9
7640 C 7
7650 D 9
7651 D 9
7652 D 9
7653 D 9
7654 D 9
7655 D 9
7656 E 7
7657 D 7
7658 E 8
7659 E 7
7660 E 8
7661 D 8
7662 D 8
7690 D 6
7701 C 5
7710 A 9
7720 A 8
7730 B 8
7740 A 7
7780 E 9
7781 E 9
7783 E 8
7784 E 9
7787 E 9
7788 A 6
7820 A 4
7850 B 4
7851 E 6
7852 B 2
7853 B 2
7856 B 3
7860 A 2
7861 B 3
T001 A 4
T002 A 3
T003 A 3
T004 A 4
T005 A 3
T006 A 4
T007 A 4
T008 A 4
T009 A 3
T010 A 4
T011 A 4
T012 A 4
T013 A 4
T014 B 3
T015 A 5
T016 A 5
T018 A 3
T019 A 4
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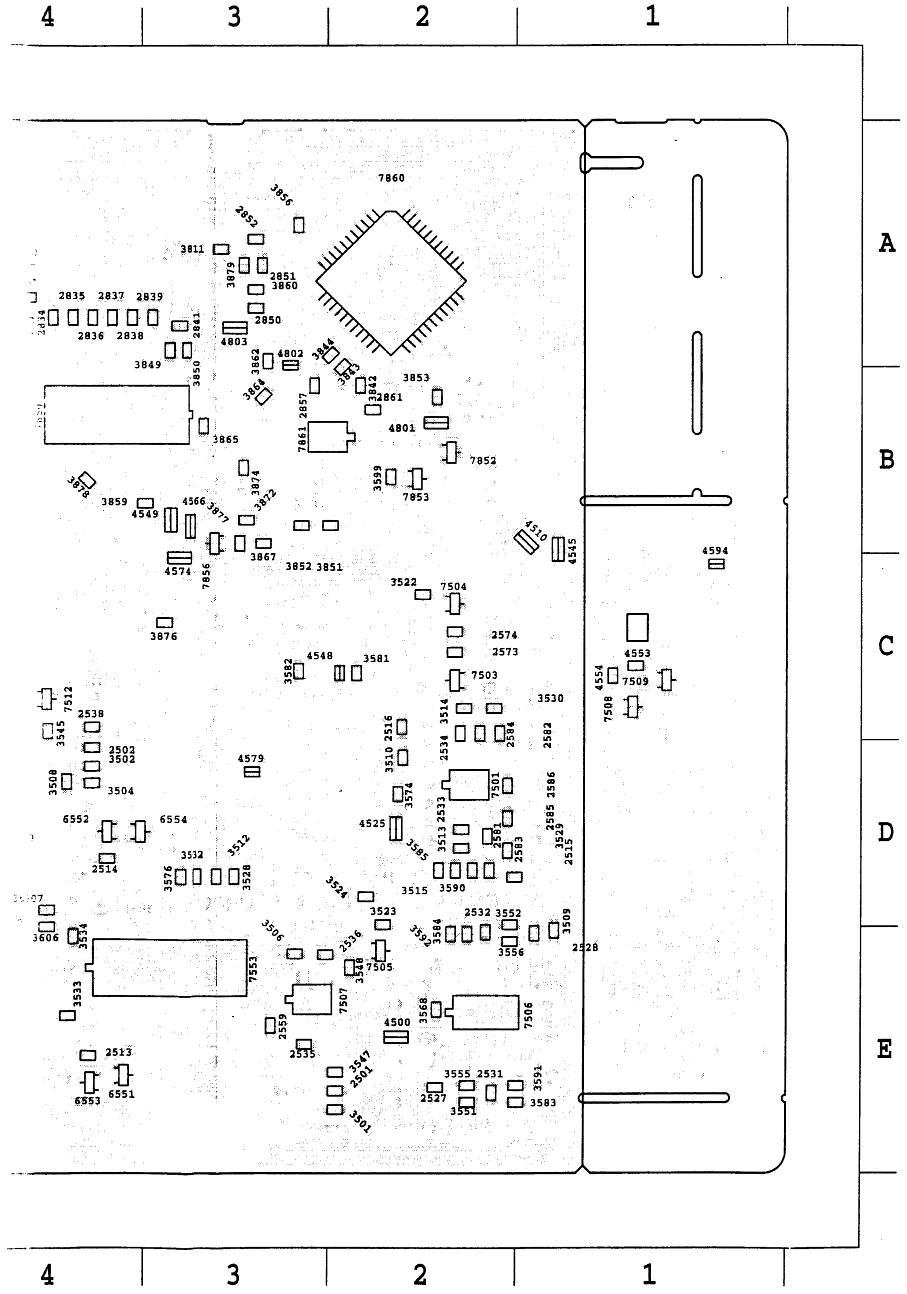

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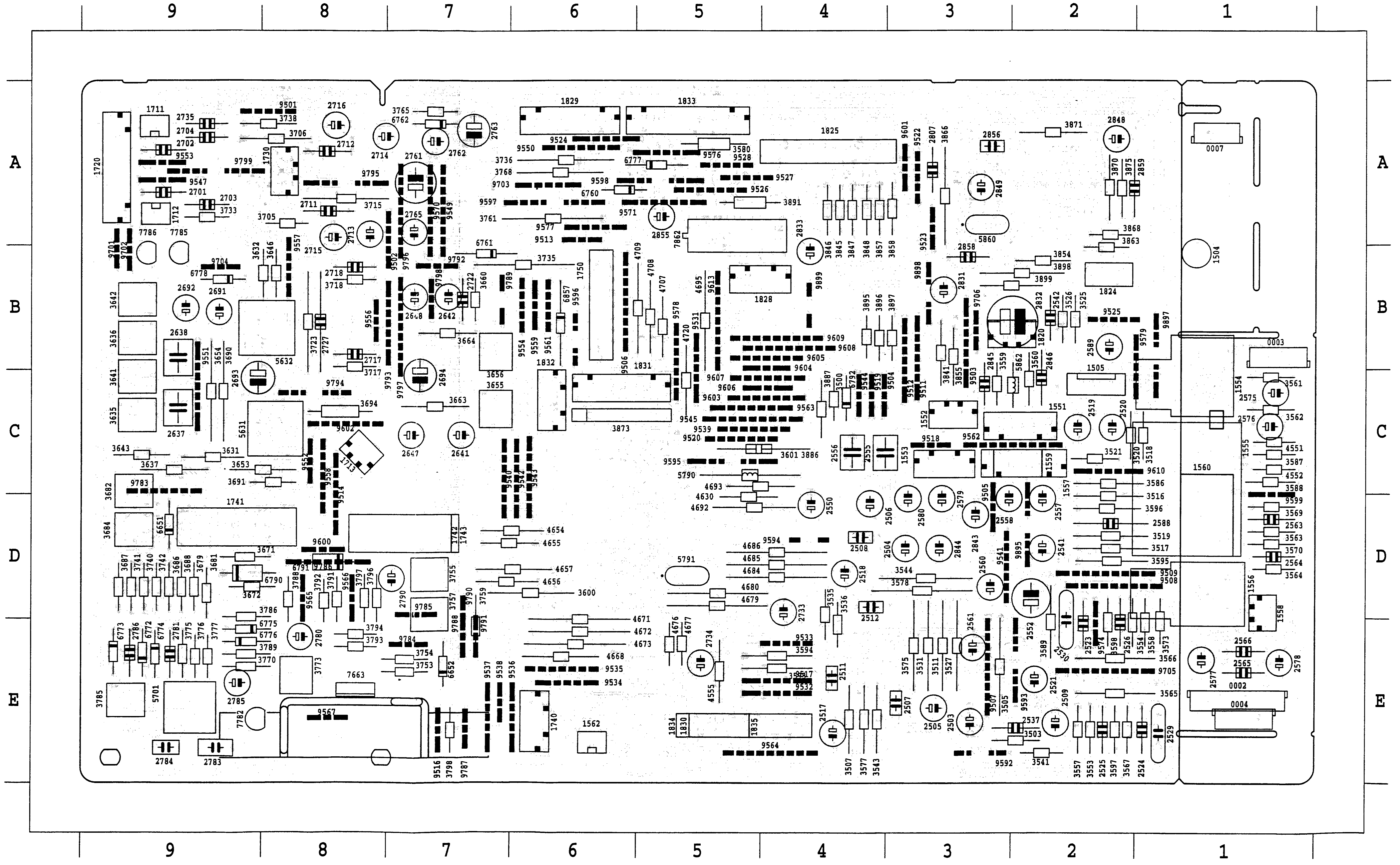

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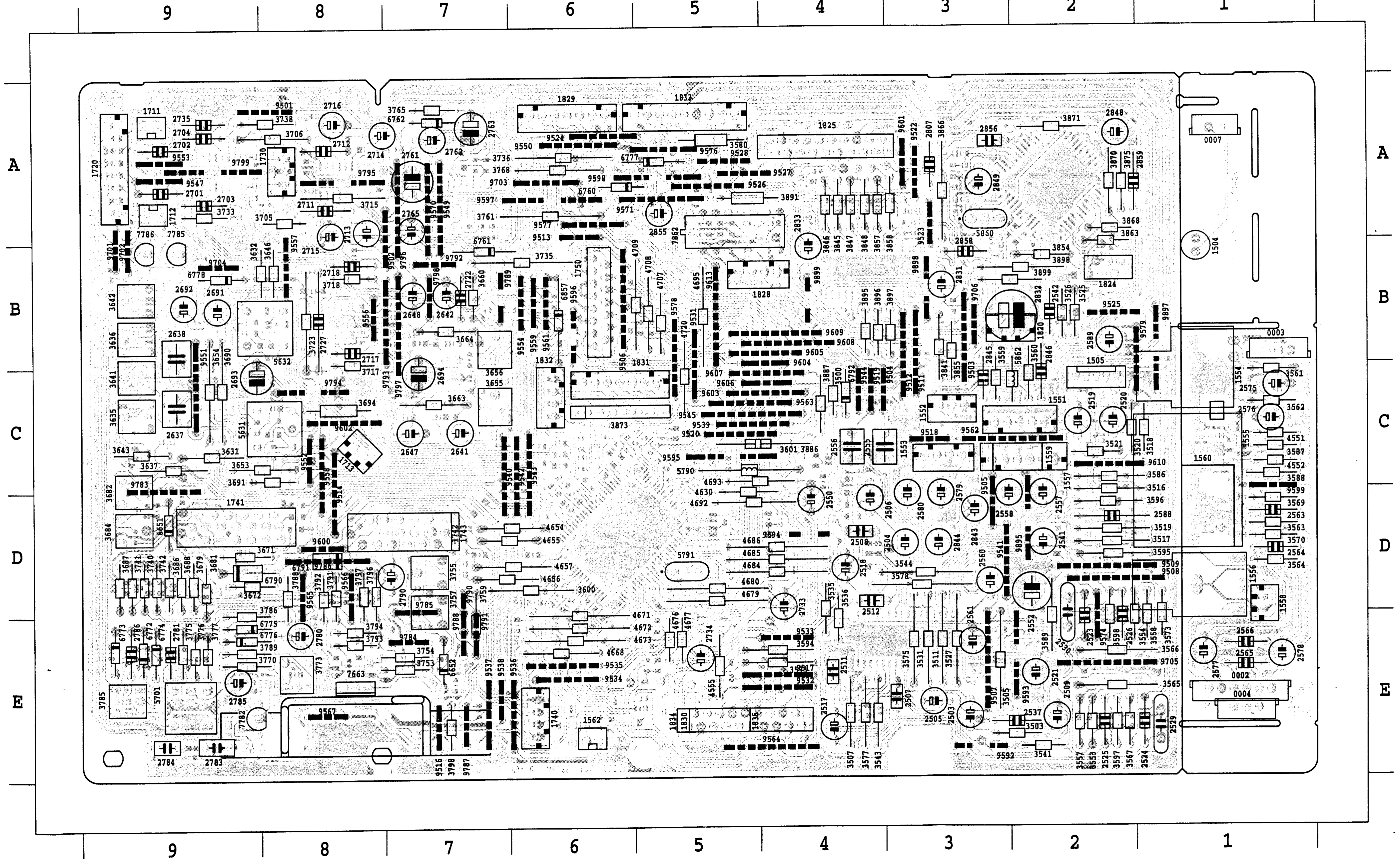

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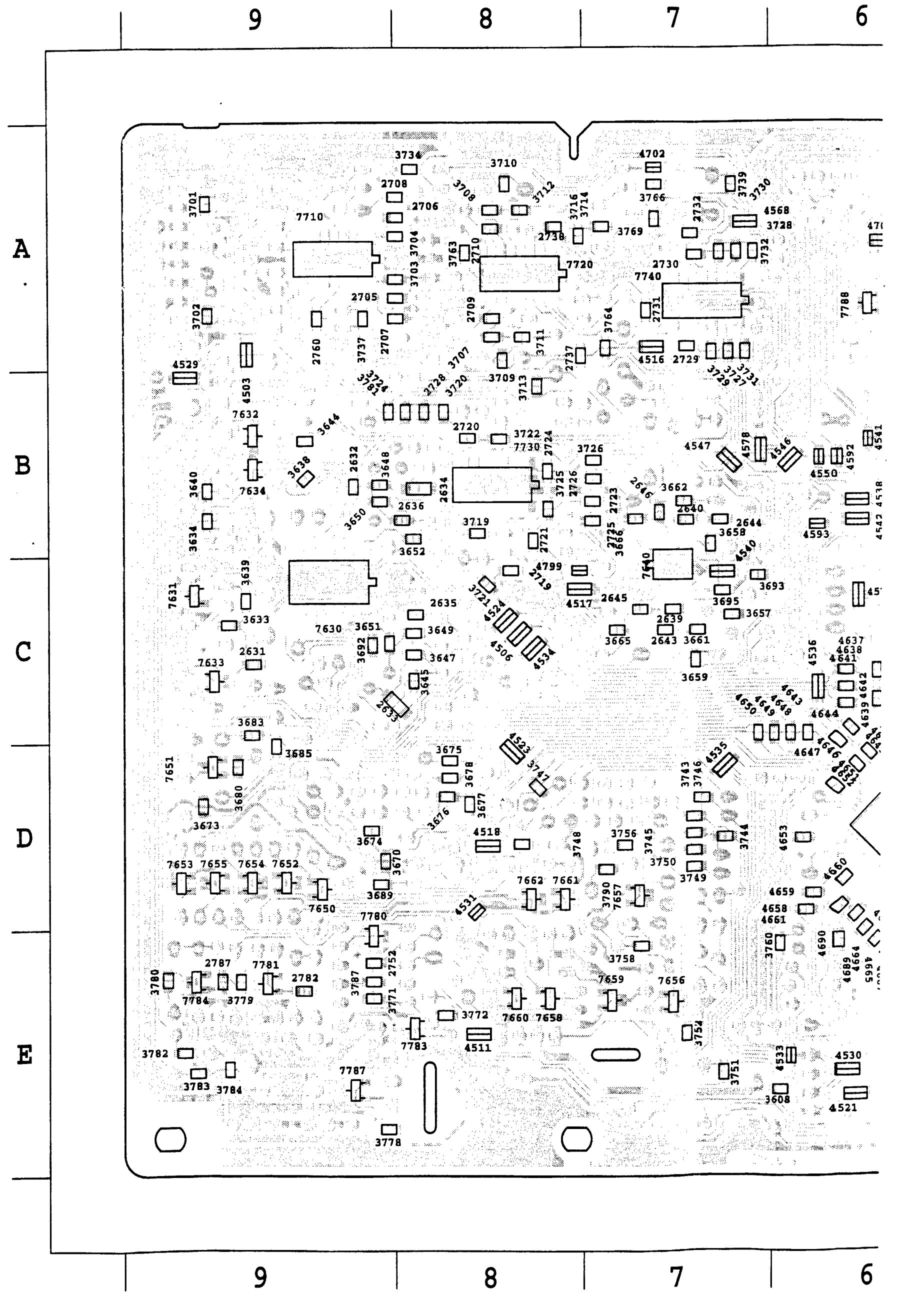

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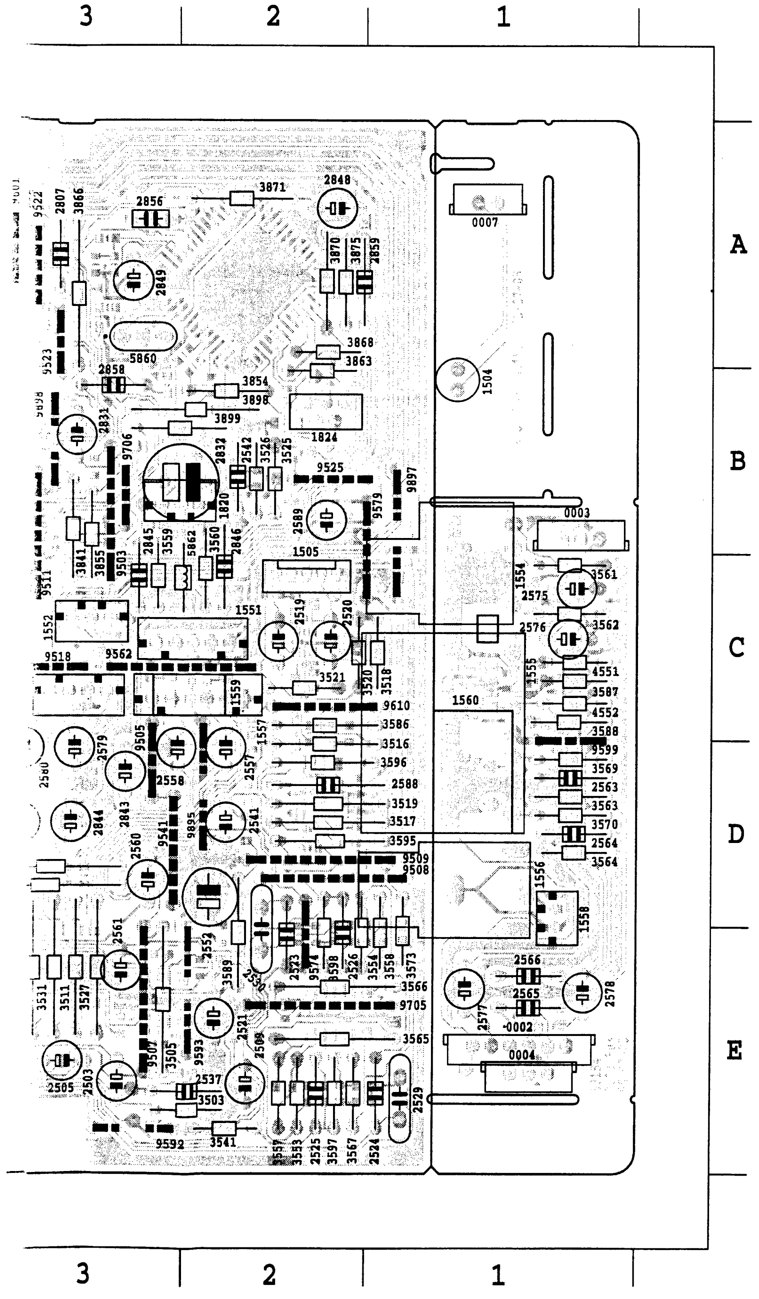
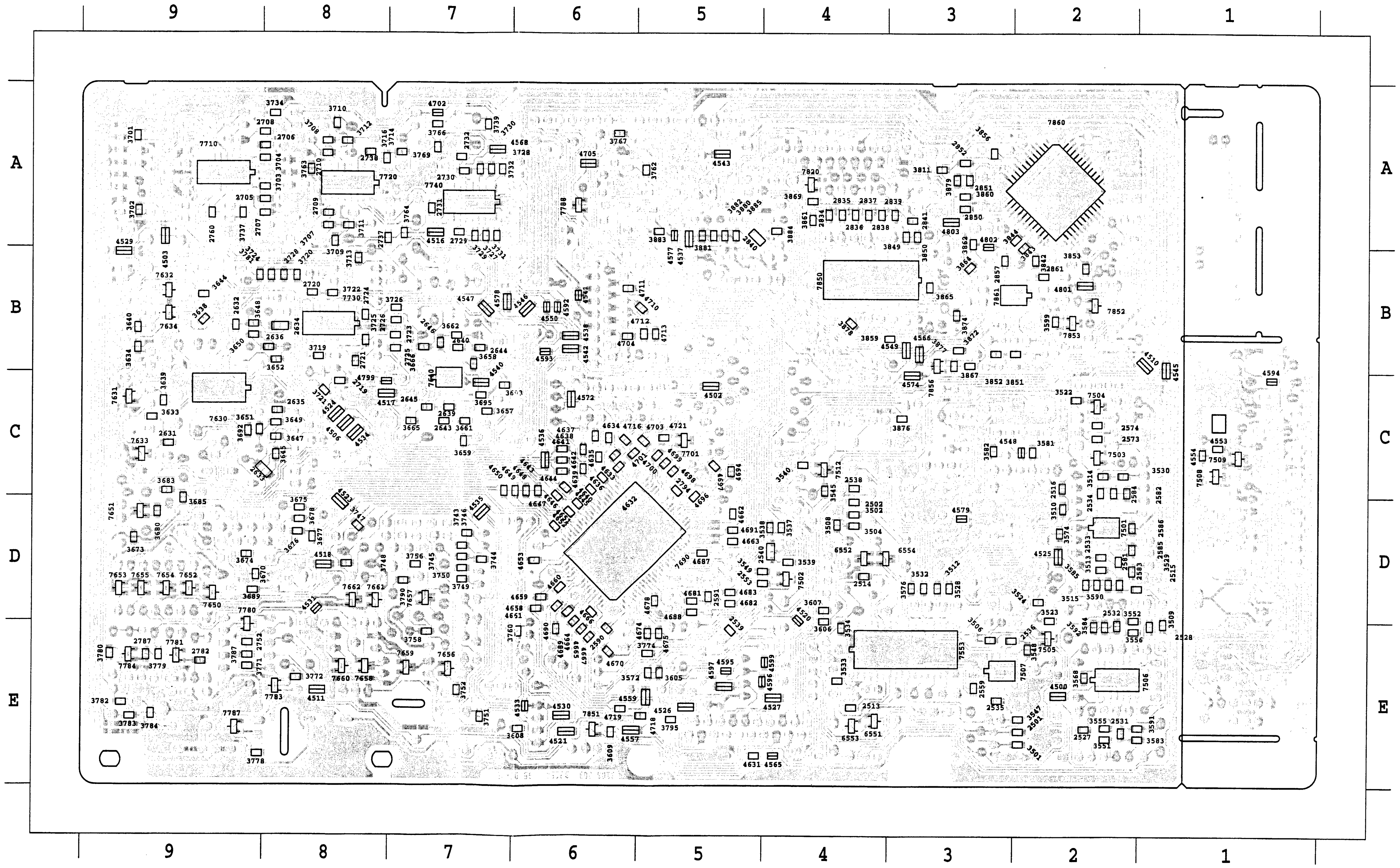
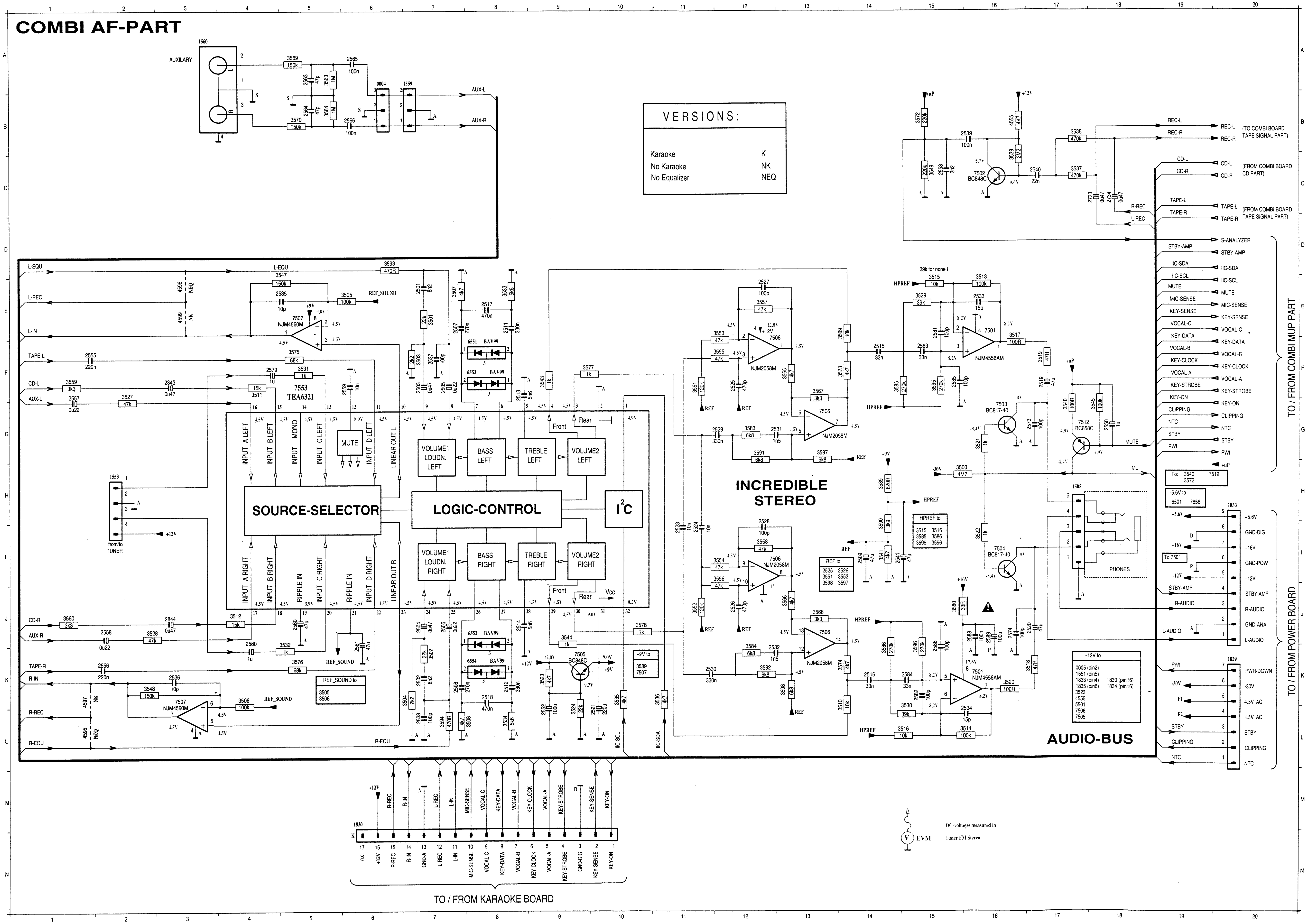


2501 E 2	2586 D 2	2729 A 7	3504 D 4	3551 E 2	3639 C 9	3685 D 9	3729 A 7	3774 E 5	3869 A 4	4525 D 2	4559 E 5	4640 C 6	4674 E 5	4716 C 5	7631 C 9	7783 E 8	T015 A 5	T042 C 2	T074 C 3	T114 D 8	T143 B 6
2502 D 4	2631 C 9	2730 A 7	3506 E 3	3552 D 2	3640 B 9	3689 D 9	3730 A 7	3778 E 9	3872 B 3	4526 E 5	4561 E 5	4641 C 6	4675 E 5	4718 E 5	7632 B 9	7784 E 9	T016 A 5	T043 A 3	T076 C 3	T115 D 8	T144 A 6
2513 E 4	2632 B 9	2731 A 7	3508 D 4	3555 E 2	3644 B 9	3692 C 9	3731 A 7	3779 E 9	3874 B 3	4527 E 4	4565 E 4	4642 C 6	4678 D 5	4719 E 5	7633 C 9	7787 E 9	T018 A 3	T045 C 2	T078 A 5	T116 D 9	T145 B 6
2514 D 4	2633 C 8	2732 A 7	3509 E 1	3556 E 2	3645 C 8	3693 C 7	3732 A 7	3780 E 9	3876 C 3	4529 B 9	4566 B 3	4643 C 6	4681 D 5	4721 C 5	7634 B 9	7788 A 6	T019 A 4	T046 C 1	T079 C 3	T117 C 9	T146 B 6
2515 D 2	2634 B 8	2737 A 8	3510 D 2	3568 E 2	3647 C 8	3695 C 7	3734 A 8	3782 E 9	3877 B 3	4530 E 6	4568 A 7	4644 C 6	4682 D 5	4723 C 8	7640 C 7	7820 A 4	T020 B 2	T047 A 6	T080 D 3	T118 D 9	T147 D 5
2516 C 2	2635 C 8	2738 A 8	3512 D 3	3572 E 6	3648 B 9	3701 A 9	3737 A 9	3783 E 9	3878 B 4	4531 D 8	4572 C 6	4645 C 6	4683 D 5	4724 B 8	7650 D 9	7850 B 4	T021 B 2	T048 B 6	T081 C 2	T119 D 9	T148 E 5
2527 E 2	2636 B 8	2752 E 9	3513 D 2	3574 D 2	3649 C 8	3702 A 9	3743 D 7	3784 E 9	3879 A 3	4533 E 6	4574 C 3	4646 D 6	4687 D 5	4799 C 8	7651 D 9	7851 E 6	T022 B 2	T049 A 3	T082 C 3	T120 D 9	T149 E 7
2528 E 1	2639 C 7	2760 A 8	3514 C 2	3576 D 3	3650 B 9	3703 A 8	3744 D 7	3787 E 9	3880 A 5	4534 C 8	4577 A 5	4647 D 6	4688 D 5	4801 B 2	7652 D 9	7852 B 2	T023 A 2	T050 B 3	T083 E 6	T121 D 9	T161 B 9
2531 E 2	2640 B 7	2782 E 9	3515 D 2	3581 C 2	3651 C 9	3704 A 8	3745 D 7	3790 D 7	3881 A 5	4535 D 7	4578 B 7	4648 C 6	4689 D 6	4802 A 3	7653 D 9	7853 B 2	T024 B 5	T051 A 5	T084 E 5	T122 D 9	T162 E 9
2532 E 2	2643 C 7	2787 E 9	3522 C 2	3582 C 3	3652 B 8	3707 A 8	3746 D 7	3811 A 3	3882 A 5	4536 C 6	4579 D 3	4649 C 6	4690 E 6	4803 A 3	7654 D 9	7856 B 3	T025 B 5	T052 A 6	T085 E 6	T123 D 9	T163 A 9
2533 D 2	2644 B 7	2794 C 5	3523 D 2	3583 E 1	3657 C 7	3708 A 8	3747 D 8	3842 B 2	3883 A 5	4537 A 5	4592 A 6	4650 C 7	4691 D 5	6551 E 4	7655 D 9	7860 A 2	T026 B 4	T053 A 6	T086 E 5	T124 D 9	T164 A 9
2534 C 2	2645 C 7	2834 A 4	3524 D 2	3584 E 2	3658 B 7	3709 A 8	3748 D 8	3843 B 2	3884 A 4	4538 B 6	4593 B 6	4651 C 6	4694 C 5	6552 D 4	7656 E 7	7861 B 3	T027 A 4	T054 A 6	T087 E 6	T125 D 7	T165 A 9
2535 E 3	2646 B 7	2835 A 4	3528 D 3	3585 D 2	3659 C 7	3710 A 8	3749 D 7	3844 A 2	3885 A 5	4540 C 7	4594 C 1	4652 D 6	4696 D 5	6553 E 4	7657 D 7	T001 A 4	T028 B 3	T055 B 2	T088 E 4	T126 D 7	T166 B 9
2536 E 3	2705 A 8	2836 A 4	3529 D 2	3590 D 2	3661 C 7	3711 A 8	3750 D 7	3849 A 3	4500 E 2	4541 B 6	4595 E 5	4653 D 6	4697 C 5	6554 D 4	7658 E 8	T002 A 3	T029 B 2	T056 A 5	T089 E 6	T127 E 7	T167 A 8
2538 C 4	2706 A 8	2837 A 4	3530 C 2	3591 E 1	3662 B 7	3712 A 8	3751 E 7	3850 A 3	4502 C 5	4542 B 6	4596 E 4	4658 D 6	4698 C 5	7501 D 2	7659 E 7	T003 A 3	T030 B 2	T057 A 5	T090 E 4	T128 D 7	T168 A 8
2539 E 5	2707 A 8	2838 A 4	3532 D 3	3592 E 2	3665 C 7	3713 A 8	3752 E 7	3851 B 2	4503 A 9	4543 A 5	4597 E 5	4659 D 6	4699 C 5	7502 D 4	7660 E 8	T004 A 4	T031 C 6	T059 A 5	T091 E 6	T129 E 7	T169 A 8
2540 D 4	2708 A 8	2839 A 3	3533 E 4	3599 B 2	3666 B 7	3714 A 7	3756 D 7	3852 B 3	4506 C 8	4545 B 1	4599 E 4	4660 D 6	4700 C 5	7503 C 2	7661 D 8	T005 A 3	T032 B 3	T061 E 3	T092 E 4	T130 D 7	T170 E 8
2553 D 5	2709 A 8	2840 A 5	3534 E 4	3600 E 6	3670 D 9	3716 A 8	3758 E 7	3853 B 2	4510 B 1	4546 B 6	4631 E 5	4661 E 6	4701 C 5	7504 C 2	7662 D 8	T006 A 4	T033 C 6	T062 E 4	T093 E 1	T131 E 7	T171 A 7
2559 E 3	2710 A 8	2841 A 3	3537 D 4	3605 E 5	3673 D 9	3719 B 8	3760 E 6	3856 A 3	4511 E 8	4547 B 7	4632 C 6	4662 D 5	4702 A 7	7505 E 2	7690 D 6	T007 A 4	T034 C 5	T063 A 5	T094 E 1	T132 D 8	T172 B 7
2573 C 2	2719 C 8	2850 A 3	3538 D 4	3606 E 4	3674 D 9	3720 B 8	3762 A 5	3859 B 3	4516 A 7	4548 C 2	4633 C 6	4663 D 5	4703 C 5	7506 E 2	7701 C 5	T008 A 4	T035 C 5	T064 E 5	T095 C 1	T133 E 7	T173 C 9
2574 C 2	2720 B 8	2851 A 3	3539 D 4	3607 D 4	3675 D 8	3721 C 8	3763 A 8	3860 A 3	4517 C 8	4549 B 3	4634 C 6	4664 D 6	4704 B 6	7507 E 3	7710 A 9	T009 A 3	T036 C 5	T065 E 5	T096 C 1	T134 D 8	T174 B 9
2581 D 2	2721 B 8	2852 A 3	3540 C 4	3608 E 6	3676 D 8	3722 B 8	3764 A 7	3861 A 4	4518 D 8	4550 B 6	4635 C 6	4665 E 6	4705 A 6	7508 C 1	7720 A 8	T010 A 4	T037 C 5	T066 E 3	T097 D 1	T135 E 8	T175 C 8
2582 C 2	2723 B 7	2857 B 3	3545 C 4	3609 E 6	3677 D 8	3725 B 8	3767 A 6	3862 A 3	4520 D 4	4553 C 1	4636 C 6	4666 D 6	4710 B 5	7509 C 1	7730 B 8	T011 A 4	T038 C 6	T067 E 3	T098 D 1	T139 B 6	T176 C 9
2583 D 2	2724 B 8	2861 B 2	3547 E 2	3633 C 9	3678 D 8	3726 B 7	3769 A 7	3864 B 3	4521 E 6	4554 C 1	4637 C 6	4667 E 6	4711 B 6	7512 C 4	7740 A 7	T012 A 4	T039 C 6	T068 E 5	T099 E 1	T140 B 6	T177 B 5
2584 C 2	2725 B 7	3501 E 2	3548 E 2	3634 B 9	3680 D 9	3727 A 7	3771 E 9	3865 B 3	4523 D 8	4557 E 6	4638 C 6	4669 E 6	4712 B 5	7553 E 3	7780 E 9	T013 A 4	T040 C 6	T072 D 2	T100 E 6	T141 B 6	
2585 D 2	2726 B 7	3502 D 4	3549 D 5	3638 B 9	3683 C 9	3728 A 7	3772 E 8	3867 B 3	4524 C 8	4558 E 6	4639 C 6	4670 E 6	4713 B 5	7630 C 9	7781 E 9	T014 B 3	T041 C 6	T073 B 2	T113 D 8	T142 A 5	



COMBI AF-PART


1560
AUXILARY
3569 150k
2565 100n
2563 47p
3563 1M
2564 47p
3564 1M
3570 150k
2566 100n
0004
1559
AUX-L
AUX-R
VERSIONS:
Karaoke K
No Karaoke NK
No Equalizer NEQ
L-EQU
L-REC
L-IN
TAPE-L
CD-L
AUX-L
CD-R
AUX-R
TAPE-R
R-IN
R-REC
R-EQU
3593 470R
3547 150k
3535
3505 100k
REF_SOUND
7507 NJM4560M
3575 68k
2555 220n
3559 3k3
2843 0u47
3527 47k
2557 0u22
3511 15k
3531 1k
2579 1u
7553 TEA6321
INPUT A LEFT
INPUT B LEFT
INPUT MONO
INPUT C LEFT
MUTE
INPUT D LEFT
LINEAR OUT L
VOLUME1 LOUDN. LEFT
BASS LEFT
TREBLE LEFT
VOLUME2 LEFT
SOURCE-SELECTOR
LOGIC-CONTROL
I²C
INPUT A RIGHT
INPUT B RIGHT
RIPPLE IN
INPUT C RIGHT
RIPPLE IN
INPUT D RIGHT
LINEAR OUT R
VOLUME1 LOUDN. RIGHT
BASS RIGHT
TREBLE RIGHT
VOLUME2 RIGHT
Front
Rear
Vcc
6551 BAV99
6553 BAV99
6552 BAV99
6554 BAV99
2517 470n
2518 470n
1553
fromto TUNER
+12V
3560 3k3
2844 0u47
2558 0u22
3528 47k
3512 15k
2580 1u
3532 1k
3576 68k
REF_SOUND to
3505
3506
2556 220n
2536 10p
3548 150k
3506 100k
3577 1k
3544 1k
3578 1k
7505 BC848C
-9V to
3589
7507
IIC-SCL
IIC-SDA
INCREDIBLE STEREO
2527 100p
3557 47k
3553 47k
3555 47k
7506 NJM2058M
3551 120k
2525 470p
3565 4k7
3567 3k3
2529 330n
3583 6k8
2531 1n5
3591 6k8
3597 6k8
REF
3509 10k
3573 4k7
2515 33n
HPREF
2528 100p
3558 47k
3554 47k
3556 47k
3552 120k
2526 470p
3566 4k7
3568 3k3
3584 6k8
2532 1n5
3592 6k8
2530 330n
3598 6k8
3574 4k7
3510 10k
2523 10n
2524 10n
3589 820R
3590 3k9
3541 4k7
2509 47u
2541 47u
HPREF to
3515 3516
3585 3586
3595 3596
REF to
2525 2526
3551 3552
3598 3597
39k for none I
3515 10k
3513 100k
3529 39k
2533 15p
2581 100p
2583 33n
3585 270k
3595 270k
2585 100p
7501 NJM4556AM
3517 100R
3519 47R
2519 47u
3572 220k
3549 220k
2553 2n2
2539 100n
7502 BC848C
4555 4K7
3539 2M2
2540 22n
3538 470k
3537 470k
2733 0u47
2734 0u47
REC-L
REC-R
CD-L
CD-R
TAPE-L
TAPE-R
(TO COMBI BOARD TAPE SIGNAL PART)
(FROM COMBI BOARD CD PART)
(FROM COMBI BOARD TAPE SIGNAL PART)
R-REC
L-REC
S-ANALYZER
STBY-AMP
IIC-SDA
IIC-SCL
MUTE
MIC-SENSE
KEY-SENSE
VOCAL-C
KEY-DATA
VOCAL-B
KEY-CLOCK
VOCAL-A
KEY-STROBE
KEY-ON
CLIPPING
NTC
STBY
PWI
+uP
TO / FROM COMBI MUP PART
7503 BC817-40
7512 BC858C
3540 100R
3545 100k
2550 1u
2573 100p
3521 1k
3500 4M7
ML
To: 3540 7512 3572
+5.6V to 6501 7856
1505
PHONES
7504 BC817-40
3522 1k
1833
+5.6V
GND-DIG
+16V
GND-POW
+12V
STBY AMP
R-AUDIO
GND-ANA
L-AUDIO
To 7501
TO / FROM POWER BOARD
1829
PWR-DOWN
-30V
4.5V AC
STBY
CLIPPING
NTC
3580 33R
2588 100n
2589 100u
2574 100p
2520 47u
3518 47R
3586 270k
3596 270k
2586 100p
2516 33n
2584 33n
2582 100p
3530 39k
2534 15p
3516 10k
3514 100k
3520 100R
+12V to
0005 (pin2)
1551 (pin5)
1833 (pin4) 1830 (pin16)
1835 (pin6) 1834 (pin16)
3523
4555
5501
7506
7505
AUDIO-BUS
1830
R-REC
R-IN
GND-A
L-REC
L-IN
MIC-SENSE
VOCAL-C
KEY-DATA
VOCAL-B
KEY-CLOCK
VOCAL-A
KEY-STROBE
GND-DIG
KEY-SENSE
KEY-ON
n.c.
TO / FROM KARAOKE BOARD
DC-voltages measured in Tuner FM Stereo
EVM

0002	A 7
0004	A 6
1505	H17
1553	H 2
1559	A 7
1560	A 3
1829	K20
1830	M 6
1833	H20
2501	E 7
2502	K 7
2503	F 7
2504	J 7
2505	F 7
2506	J 7
2507	E 7
2508	K 7
2509	I14
2511	E 8
2512	K 8
2513	F 8
2514	J 8
2515	F14
2516	K14
2517	E 8
2518	K 8
2519	F17
2520	J17
2521	L10
2523	I11
2524	I11
2525	F12
2526	J12
2527	E12
2528	I12
2529	G12
2530	K11
2531	G12
2532	K12
2533	E16
2534	L16
2535	E 5
2536	K 3
2537	F 7
2538	L 7
2539	B16
2540	C17
2541	I14
2550	G18
2552	L 9
2553	C15
2555	F 1
2556	K 2
2557	F 1
2558	J 2
2559	F 6
2560	J 5
2561	J 6
2563	A 4
2564	B 4
2565	A 5
2566	B 5
2573	G17
2574	J16
2579	F 4
2580	J 4
2581	E15
2582	K15
2583	F15
2584	K15
2585	F15
2586	K15
2588	J16
2589	J16
2733	C18
2734	C18
2843	F 3
2844	J 3
3500	H15
3501	E 7
3502	K 7
3503	F 7
3504	K 7
3505	E 6
3506	K 4
3507	E 7
3508	L 8
3509	E14
3510	K14
3511	F 4
3512	J 4
3513	E16
3514	L16
3515	E15
3516	L15
3517	E16
3518	K17
3519	F17
3520	K16
3521	G16
3522	I16
3523	K 9
3524	L 9
3527	F 2
3528	J 2
3529	E15
3530	L15
3531	F 5
3532	J 5
3533	E 8
3534	L 8
3535	K10
3536	K11
3537	C17
3538	B17
3539	C16
3540	G17
3541	I14
3543	F 9
3544	J 9
3545	G18
3547	D 5
3548	K 2
3549	C15
3551	F11
3552	J11
3553	E12
3554	I12
3555	F12
3556	I12
3557	E12
3558	I12
3559	F 1
3560	J 1
3563	A 5
3564	B 5
3565	F13
3566	J13
3567	F13
3568	J13
3569	A 4
3570	B 4
3572	B15
3573	F14
3574	K14
3575	F 5
3576	K 5
3577	F 9
3578	J10
3580	J15
3569	A 4
3570	B 4
3572	B15
3573	F14
3574	K14
3575	F 5
3576	K 5
3577	F 9
3578	J10
3580	J15
3583	G12
3584	K12
3585	F14
3586	K14
3589	H14
3590	I14
3591	G12
3592	K12
3593	D 6
3594	L 7
3595	F15
3596	K15
3597	G13
3598	K13
4555	B16
4594	I 2
4595	L 1
4596	E 3
4597	K 1
4599	E 3
6551	F 8
6552	J 8
6553	F 8
6554	K 8
7501	E16
7501	K16
7502	C16
7503	G16
7504	I16
7505	K 9
7506	F12
7506	G13
7506	I12
7506	J13
7507	E 5
7507	K 3
7512	G17
7553	F 5
9599	B 2

MISCELLANEOUS

1560	4822 265 20553	CHINCH SOCKET

DIODES

6651	4822 130 30621	1N4148
6760	4822 130 34382	BZX79-C8V2
6761	4822 130 30621	1N4148
6762	4822 130 30621	1N4148
6772	4822 130 30621	1N4148
6773	4822 130 30621	1N4148
6774	4822 130 30621	1N4148
6775	4822 130 30621	1N4148
6776	4822 130 30621	1N4148
6777	4822 130 34382	BZX79-C8V2
6778	4822 130 30621	1N4148
6790	5322 130 30684	1N4002
6791	5322 130 30684	1N4002
6792	4822 130 30621	1N4148
6857	4822 130 30621	1N4148

TRANSISTORS

	5322 130 60068	BC558C
7502	5322 130 42136	BC848C(CHIP)
7503	4822 130 42615	BC817-40(CHIP)
7504	4822 130 42615	BC817-40(CHIP)
7505	5322 130 42136	BC848C(CHIP)
7506	5322 130 42136	BC848C(CHIP)
7507	5322 130 42136	BC848C(CHIP)
7512	4822 130 42513	BC858C
7631	5322 130 42136	BC848C(CHIP)
7632	5322 130 42136	BC848C(CHIP)
7633	5322 130 42136	BC848C(CHIP)
7634	5322 130 42136	BC848C(CHIP)
7640	5322 130 42136	BC848C(CHIP)
7650	5322 130 42136	BC848C(CHIP)
7651	4822 130 42513	BC858C
7652	5322 130 42136	BC848C(CHIP)
7653	5322 130 60123	BC807-40 (CHIP)
7654	5322 130 42136	BC848C(CHIP)
7655	5322 130 60123	BC807-40 (CHIP)
7661	5322 130 60123	BC807-40 (CHIP)
7662	5322 130 42136	BC848C(CHIP)
7663	4822 130 40982	BD433
7001	4822 130 40982	BD433
7690	4822 130 40982	BD433
7701	5322 130 42136	BC848C(CHIP)
7780	5322 130 42136	BC848C(CHIP)
7781	5322 130 42136	BC848C(CHIP)
7782	4822 130 41715	BC328-40
7783	5322 130 42136	BC848C(CHIP)
7784	4822 130 60373	BC856B
7785	4822 130 63494	J111
7786	4822 130 63494	J111
7787	4822 130 42513	BC858C
7788	4822 130 42513	BC858C
7820	4822 130 42615	BC817-40(CHIP)
7851	5322 130 42136	BC848C(CHIP)
7856	5322 130 42136	BC848C(CHIP)

INTEGRATED CIRCUITS

7501	4822 209 31378	NJM4556M
7553	4822 209 33652	TEA6321T/V1
7630	4822 209 90406	CXA1101M
7710	4822 209 32919	HEF4952BT
7720	4822 209 32918	AN7318S
7730	4822 209 32919	HEF4952BT
7740	4822 209 32919	HEF4952BT
7850	4822 209 31064	TDA1301T/N1
7860	4822 209 90618	SAA7345GP/S5
7861	4822 209 90618	SAA7345GP/S5
7862	4822 209 32852	TDA7073A/N2

COILS

5631	4822 156 21725	MPX FILTER
5632	4822 156 21725	MPX FILTER
5701	4822 156 20946	OSC.COIL 100kHz
5790	4822 156 21721	COIL 2,2μH
5791	5322 242 73697	CERAM.RES. 8MHz
5860	4822 242 81865	CER.RES. 16.93MHz
5862	4822 156 21721	COIL 2,2μH
6551	4822 156 21721	COIL 2,2μH
6552	4822 156 21721	COIL 2,2μH
6553	4822 156 21721	COIL 2,2μH
6554	4822 156 21721	COIL 2,2μH

RESISTORS

3500	4822 111 30893	4M7	5%	0,2W
3503	4822 116 52256	2k2	5%	0,16W
3505	4822 116 52234	100k	5%	0,5W
3507	4822 116 52283	4k7	5%	0,5W
3511	4822 116 52244	15k	5%	0,5W
3516	4822 116 83864	10k	5%	0,5W
3517	4822 116 52175	100R	5%	0,5W
3518	4822 116 52195	47R	5%	0,5W
3519	4822 116 52195	47R	5%	0,5W
3520	4822 116 52175	100R	5%	0,5W
3521	4822 050 11002	1k	5%	0,2W
3527	4822 116 52284	47k	5%	0,5W
3531	4822 050 11002	1k	5%	0,2W
3535	4822 116 52283	4k7	5%	0,5W
3536	4822 116 52283	4k7	5%	0,5W
3541	4822 116 52283	4k7	5%	0,5W
3543	4822 050 11002	1k	5%	0,2W
3544	4822 050 11002	1k	5%	0,2W
3553	4822 116 52284	47k	5%	0,5W
3554	4822 116 52284	47k	5%	0,5W
3557	4822 116 52284	47k	5%	0,5W
3558	4822 116 52284	47k	5%	0,5W
3559	4822 116 52269	3k3	5%	0,5W
3560	4822 116 52269	3k3	5%	0,5W
3563	4822 116 52235	1M	5%	0,5W
3564	4822 116 52235	1M	5%	0,5W
3565	4822 116 52283	4k7	5%	0,5W
3566	4822 116 52283	4k7	5%	0,5W
3567	4822 116 52269	3k3	5%	0,5W
3569	4822 116 52245	150k	5%	0,16W
3570	4822 116 52245	150k	5%	0,16W
3573	4822 116 52283	4k7	5%	0,5W
3575	4822 116 52297	68k	5%	0,5W
3577	4822 050 11002	1k	5%	0,2W
3578	4822 050 11002	1k	5%	0,2W

RESISTORS

3580	4822 052 10339	33R	5%	NFR
3586	4822 116 83878	270k	5%	0,5W
3589	4822 116 52231	820R	5%	0,5W
3593	4822 116 52224	470R	5%	0,5W
3594	4822 116 52224	470R	5%	0,5W
3595	4822 116 83878	270k	5%	0,5W
3596	4822 116 83878	270k	5%	0,5W
3597	4822 116 52296	6k8	5%	0,5W
3598	4822 116 52296	6k8	5%	0,5W
3600	4822 116 52284	47k	5%	0,5W
3601	4822 116 52235	1M	5%	0,5W
3631	4822 116 52239	120k	5%	0,5W
3632	4822 116 52239	120k	5%	0,5W
3635	4822 100 20166	10k		TRIMPOT.
3636	4822 100 20166	10k		TRIMPOT.
3637	4822 116 52284	47k	5%	0,5W
3641	4822 100 20166	10k		TRIMPOT.
3642	4822 100 20166	10k		TRIMPOT.
3643	4822 116 52284	47k	5%	0,5W
3646	4822 116 83882	39k	5%	0,5W
3653	4822 050 11002	1k	5%	0,2W
3654	4822 050 11002	1k	5%	0,2W
3655	4822 100 20166	10k		TRIMPOT.
3656	4822 100 20166	10k		TRIMPOT.
3660	4822 116 52271	33k	5%	0,16W
3663	4822 116 52252	180k	5%	0,5W
3664	4822 116 52252	180k	5%	0,5W
3671	4822 050 11002	1k	5%	0,2W
3672	4822 116 52234	100k	5%	0,5W
3679	4822 116 52284	47k	5%	0,5W
3681	4822 116 52283	4k7	5%	0,5W
3682	4822 100 20166	10k		TRIMPOT.
3684	4822 100 20166	10k		TRIMPOT.
3686	4822 116 52284	47k	5%	0,5W
3687	4822 050 11002	1k	5%	0,2W
3688	4822 116 52234	100k	5%	0,5W
3690	4822 116 83864	10k	5%	0,5W
3691	4822 116 83864	10k	5%	0,5W
3694	4822 052 10109	10R	5%	0,33W
3705	4822 116 52215	220R	5%	0,16W
3706	4822 116 52215	220R	5%	0,16W
3715	4822 116 52249	1k8	5%	0,16W
3717	4822 116 52276	3k9	5%	0,5W
3718	4822 116 52276	3k9	5%	0,5W
3723	4822 116 52238	12k	5%	0,5W
3733	4822 116 52215	220R	5%	0,16W
3735	4822 116 52264	27k	5%	0,5W
3736	4822 116 52264	27k	5%	0,5W
3738	4822 116 52283	4k7	5%	0,5W
3740	4822 116 52284	47k	5%	0,5W
3741	4822 050 11002	1k	5%	0,2W
3742	4822 116 52234	100k	5%	0,5W
3759	4822 050 11002	1k	5%	0,2W
3761	4822 116 83864	10k	5%	0,5W
3765	4822 116 52284	47k	5%	0,5W
3770	4822 116 52243	1k5	5%	0,16W
3773	4822 100 20166	10k		TRIMPOT.
3775	4822 116 52186	22R	5%	0,5W
3776	4822 116 52296	6k8	5%	0,5W
3777	4822 116 52211	150R	5%	0,5W

RESISTORS

3778	4822 116 52211	150R	5%	0,5W
3785	4822 100 11163	TRIMPOT.		100klin.
3786	4822 116 52256	2k2	5%	0,16W
3788	4822 116 52235	1M	5%	0,5W
3789	4822 116 52257	22k	5%	0,5W
3796	4822 050 11002	1k	5%	0,2W
3797	4822 116 52234	100k	5%	0,5W
3798	4822 116 52175	100R	5%	0,5W
3841	4822 116 52176	10R	5%	0,5W
3845	4822 116 83864	10k	5%	0,5W
3846	4822 116 83864	10k	5%	0,5W
3847	4822 116 83864	10k	5%	0,5W
3848	4822 116 83864	10k	5%	0,5W
3854	4822 116 52215	220R	5%	0,16W
3855	4822 116 52256	2k2	5%	0,16W
3857	4822 116 83864	10k	5%	0,5W
3858	4822 116 83864	10k	5%	0,5W
3863	4822 116 52176	10R	5%	0,5W
3866	4822 116 52219	330R	5%	0,5W
3868	4822 116 52176	10R	5%	0,5W
3870	4822 116 52243	1k5	5%	0,16W
3871	4822 116 52186	22R	5%	0,5W
3875	4822 116 52243	1k5	5%	0,16W
3891	4822 052 10338	3R3		NFR25
3895	4822 116 52264	27k	5%	0,5W
3896	4822 116 52251	18k	5%	0,5W
3897	4822 116 52251	18k	5%	0,5W
3898	4822 116 83882	39k	5%	0,5W
3899	4822 116 83882	39k	5%	0,5W
4555	4822 116 52283	4k7	5%	0,5W
4630	4822 050 11002	1k	5%	0,2W
4654	4822 050 11002	1k	5%	0,2W
4655	4822 050 11002	1k	5%	0,2W
4656	4822 050 11002	1k	5%	0,2W
4657	4822 050 11002	1k	5%	0,2W
4668	4822 050 11002	1k	5%	0,2W
4671	4822 050 11002	1k	5%	0,2W
4672	4822 050 11002	1k	5%	0,2W
4673	4822 050 11002	1k	5%	0,2W
4676	4822 050 11002	1k	5%	0,2W
4677	4822 050 11002	1k	5%	0,2W
4679	4822 050 11002	1k	5%	0,2W
4680	4822 050 11002	1k	5%	0,2W
4684	4822 116 52256	2k2	5%	0,16W
4685	4822 116 52256	2k2	5%	0,16W
4686	4822 050 11002	1k	5%	0,2W
4692	4822 050 11002	1k	5%	0,2W
4693	4822 116 52234	100k	5%	0,5W
4695	4822 050 11002	1k	5%	0,2W
4707	4822 050 11002	1k	5%	0,2W
4708	4822 050 11002	1k	5%	0,2W
4709	4822 050 11002	1k	5%	0,2W
4720	4822 116 52278	390k	5%	0,5W

CHIP RESISTORS

3501	4822 051 20223	22k	5%	0,1W
3502	4822 051 20223	22k	5%	0,1W
3504	4822 051 20222	2k2	5%	0,1W
3506	4822 051 20104	100k	5%	0,1W
3508	4822 051 20472	4k7	5%	0,1W

ELECTRICAL PARTSLIST COMBI BOARD

CHIP RESISTORS

3509	4822 051 20103	10k	5%	0,1W
3510	4822 051 20103	10k	5%	0,1W
3512	4822 051 20153	15k	5%	0,1W
3513	4822 051 20104	100k	5%	0,1W
3514	4822 051 20104	100k	5%	0,1W
3515	4822 051 20103	10k	5%	0,1W
3522	4822 051 10102	1k	2%	0,25W
3523	4822 051 20472	4k7	5%	0,1W
3524	4822 051 20223	22k	5%	0,1W
3528	4822 051 20473	47k	5%	0,1W
3529	4822 051 20393	39k	5%	0,1W
3530	4822 051 20393	39k	5%	0,1W
3532	4822 051 10102	1k	2%	0,25W
3533	4822 051 20562	5k6	5%	0,1W
3534	4822 051 20562	5k6	5%	0,1W
3537	4822 051 20474	470k	5%	0,1W
3538	4822 051 20474	470k	5%	0,1W
3539	4822 051 20225	2M2	5%	0,1W
3540	4822 051 20101	100R	5%	0,1W
3545	4822 051 20104	100k	5%	0,1W
3547	4822 051 20154	150k	5%	0,1W
3548	4822 051 20154	150k	5%	0,1W
3549	4822 051 20224	220k	5%	0,1W
3551	4822 051 20124	120k	5%	0,1W
3552	4822 051 20124	120k	5%	0,1W
3555	4822 051 20473	47k	5%	0,1W
3556	4822 051 20473	47k	5%	0,1W
3568	4822 051 20332	3k3	5%	0,1W
3572	4822 051 20224	220k	5%	0,1W
3574	4822 051 20472	4k7	5%	0,1W
3576	4822 051 20683	68k	5%	0,1W
3583	4822 051 20682	6k8	5%	0,1W
3584	4822 051 20682	6k8	5%	0,1W
3585	4822 051 20274	270k	5%	0,1W
3590	4822 051 20392	3k9	5%	0,1W
3591	4822 051 20682	6k8	5%	0,1W
3592	4822 051 20682	6k8	5%	0,1W
3605	4822 051 20103	10k	5%	0,1W
3606	4822 051 20473	47k	5%	0,1W
3607	4822 051 20473	47k	5%	0,1W
3633	4822 051 20682	6k8	5%	0,1W
3634	4822 051 20682	6k8	5%	0,1W
3638	4822 051 20473	47k	5%	0,1W
3639	4822 051 20562	5k6	5%	0,1W
3640	4822 051 20562	5k6	5%	0,1W
3644	4822 051 20473	47k	5%	0,1W
3645	4822 051 20393	39k	5%	0,1W
3647	4822 051 20332	3k3	5%	0,1W
3648	4822 051 20332	3k3	5%	0,1W
3649	4822 051 20562	5k6	5%	0,1W
3650	4822 051 20562	5k6	5%	0,1W
3651	4822 051 10102	1k	2%	0,25W
3652	4822 051 10102	1k	2%	0,25W
3657	4822 051 10102	1k	2%	0,25W
3658	4822 051 10102	1k	2%	0,25W
3659	4822 051 20333	33k	5%	0,1W
3661	4822 051 20105	1M	5%	0,1W
3662	4822 051 20105	1M	5%	0,1W
3665	4822 117 11149	82k	1%	0,1W

CHIP RESISTORS

3666	4822 117 11149	82k	1%	0,1W
3673	4822 051 10102	1k	2%	0,25W
3674	4822 051 10102	1k	2%	0,25W
3675	4822 051 10102	1k	2%	0,25W
3676	4822 051 10102	1k	2%	0,25W
3677	4822 051 20473	47k	5%	0,1W
3678	4822 051 10102	1k	2%	0,25W
3680	4822 051 20472	4k7	5%	0,1W
3683	4822 051 20562	5k6	5%	0,1W
3685	4822 051 20472	4k7	5%	0,1W
3689	4822 051 20104	100k	5%	0,1W
3692	4822 117 11746	43k	1%	0,1W
3693	4822 051 20689	68R	5%	0,1W
3695	4822 051 20689	68R	5%	0,1W
3701	4822 051 20221	220R	5%	0,1W
3702	4822 051 20221	220R	5%	0,1W
3703	4822 051 20221	220R	5%	0,1W
3704	4822 051 20221	220R	5%	0,1W
3707	4822 051 20101	100R	5%	0,1W
3708	4822 051 20101	100R	5%	0,1W
3709	4822 051 20109	10R	5%	0,1W
3710	4822 051 20109	10R	5%	0,1W
3711	4822 051 20184	180k	5%	0,1W
3712	4822 051 20184	180k	5%	0,1W
3713	4822 051 20109	10R	5%	0,1W
3714	4822 051 20109	10R	5%	0,1W
3716	4822 051 20182	1k8	5%	0,1W
3719	4822 051 20123	12k	2%	0,1W
3720	4822 051 20123	12k	2%	0,1W
3721	4822 051 20562	5k6	5%	0,1W
3722	4822 051 20562	5k6	5%	0,1W
3724	4822 051 20123	12k	2%	0,1W
3725	4822 051 20224	220k	5%	0,1W
3726	4822 051 20224	220k	5%	0,1W
3727	4822 051 20562	5k6	5%	0,1W
3728	4822 051 20562	5k6	5%	0,1W
3729	4822 051 20272	2k7	5%	0,1W
3730	4822 051 20272	2k7	5%	0,1W
3731	4822 051 20682	6k8	5%	0,1W
3732	4822 051 20682	6k8	5%	0,1W
3734	4822 051 20221	220R	5%	0,1W
3737	4822 051 20472	4k7	5%	0,1W
3739	4822 051 20121	120R	5%	0,1W
3744	4822 051 20153	15k	5%	0,1W
3745	4822 051 10102	1k	2%	0,25W
3746	4822 051 10102	1k	2%	0,25W
3747	4822 051 20104	100k	5%	0,1W
3749	4822 051 10102	1k	2%	0,25W
3760	4822 051 20104	100k	5%	0,1W
3762	4822 051 20821	820R	5%	0,1W
3763	4822 051 20184	180k	5%	0,1W
3764	4822 051 20471	470R	5%	0,1W
3766	4822 051 20475	4M7	5%	0,1W
3767	4822 051 20223	22k	5%	0,1W
3769	4822 051 20475	4M7	5%	0,1W
3771	4822 051 10102	1k	2%	0,25W
3772	4822 051 20183	18k	5%	0,1W
3774	4822 051 20223	22k	5%	0,1W
3779	4822 051 20334	330k	5%	0,1W
3780	4822 051 20105	1M	5%	0,1W

ELECTRICAL PARTSLIST COMBI BOARD

CHIP RESISTORS

3781	4822 051 20475	4M7	5%	0,1W
3782	4822 051 20472	4k7	5%	0,1W
3783	4822 051 20472	4k7	5%	0,1W
3784	4822 051 20153	15k	5%	0,1W
3787	4822 051 20105	1M	5%	0,1W
3795	4822 051 20103	10k	5%	0,1W
3811	4822 051 10102	1k	2%	0,25W
3842	4822 051 20221	220R	5%	0,1W
3843	4822 051 20221	220R	5%	0,1W
3844	4822 051 20221	220R	5%	0,1W
3851	4822 051 20103	10k	5%	0,1W
3852	4822 051 20103	10k	5%	0,1W
3856	4822 051 20223	22k	5%	0,1W
3859	4822 051 20229	22R	5%	0,1W
3860	4822 051 20101	100R	5%	0,1W
3861	4822 051 20103	10k	5%	0,1W
3862	4822 051 20105	1M	5%	0,1W
3864	4822 051 20229	22R	5%	0,1W
3865	4822 051 20103	10k	5%	0,1W
3867	4822 051 20221	220R	5%	0,1W
3869	4822 051 20103	10k	5%	0,1W
3872	4822 051 20222	2k2	5%	0,1W
3874	4822 051 20103	10k	5%	0,1W
3876	4822 117 11139	1k5	5%	0,1W
3877	4822 051 20222	2k2	5%	0,1W
3878	4822 051 20105	1M	5%	0,1W
3879	4822 051 20154	150k	5%	0,1W
3880	4822 051 20393	39k	5%	0,1W
3882	4822 051 10102	1k	2%	0,25W
3883	4822 051 20122	1,2k	5%	0,1W
3884	4822 051 10102	1k	2%	0,25W
3885	4822 051 10102	1k	2%	0,25W
3887	4822 051 20333	33k	5%	0,1W
4500	4822 051 10008	CHIP JUMPER1206		
4502	4822 051 10008	CHIP JUMPER1206		
4503	4822 051 10008	CHIP JUMPER1206		
4506	4822 051 10008	CHIP JUMPER1206		
4510	4822 051 10008	CHIP JUMPER1206		
4511	4822 051 10008	CHIP JUMPER1206		
4516	4822 051 10008	CHIP JUMPER1206		
4517	4822 051 10008	CHIP JUMPER1206		
4518	4822 051 10008	CHIP JUMPER1206		
4520	4822 051 20008	CHIP JUMPER 0805		
4521	4822 051 10008	CHIP JUMPER1206		
4523	4822 051 10008	CHIP JUMPER1206		
4524	4822 051 10008	CHIP JUMPER1206		
4525	4822 051 10008	CHIP JUMPER1206		
4526	4822 051 10008	CHIP JUMPER1206		
4527	4822 051 10008	CHIP JUMPER1206		
4529	4822 051 10008	CHIP JUMPER1206		
4530	4822 051 10008	CHIP JUMPER1206		
4531	4822 051 20008	CHIP JUMPER 0805		
4533	4822 051 20008	CHIP JUMPER 0805		
4534	4822 051 10008	CHIP JUMPER1206		
4535	4822 051 10008	CHIP JUMPER1206		
4536	4822 051 10008	CHIP JUMPER1206		
4537	4822 051 10008	CHIP JUMPER1206		
4538	4822 051 10008	CHIP JUMPER1206		
4540	4822 051 10008	CHIP JUMPER1206		
4541	4822 051 20008	CHIP JUMPER 0805		

CHIP RESISTORS

4542	4822 051 10008	CHIP JUMPER1206		
4543	4822 051 10008	CHIP JUMPER1206		
4545	4822 051 10008	CHIP JUMPER1206		
4546	4822 051 10008	CHIP JUMPER1206		
4547	4822 051 10008	CHIP JUMPER1206		
4548	4822 051 20008	CHIP JUMPER 0805		
4549	4822 051 10008	CHIP JUMPER1206		
4550	4822 051 20008	CHIP JUMPER 0805		
4557	4822 051 10008	CHIP JUMPER1206		
4559	4822 051 10008	CHIP JUMPER1206		
4565	4822 051 20008	CHIP JUMPER 0805		
4566	4822 051 10008	CHIP JUMPER1206		
4568	4822 051 10008	CHIP JUMPER1206		
4572	4822 051 10008	CHIP JUMPER1206		
4574	4822 051 10008	CHIP JUMPER1206		
4577	4822 051 20008	CHIP JUMPER 0805		
4578	4822 051 10008	CHIP JUMPER1206		
4579	4822 051 20008	CHIP JUMPER 0805		
4595	4822 051 20008	CHIP JUMPER 0805		
4596	4822 051 20008	CHIP JUMPER 0805		
4597	4822 051 10008	CHIP JUMPER1206		
4599	4822 051 20008	CHIP JUMPER 0805		
4631	4822 051 20103	10k	5%	0,1W
4632	4822 051 10102	1k	2%	0,25W
4633	4822 051 10102	1k	2%	0,25W
4634	4822 051 10102	1k	2%	0,25W
4635	4822 051 10102	1k	2%	0,25W
4636	4822 051 10102	1k	2%	0,25W
4637	4822 051 10102	1k	2%	0,25W
4638	4822 051 10102	1k	2%	0,25W
4639	4822 051 10102	1k	2%	0,25W
4640	4822 051 10102	1k	2%	0,25W
4641	4822 051 10102	1k	2%	0,25W
4642	4822 051 10102	1k	2%	0,25W
4643	4822 051 10102	1k	2%	0,25W
4644	4822 051 10102	1k	2%	0,25W
4645	4822 051 10102	1k	2%	0,25W
4646	4822 051 10102	1k	2%	0,25W
4647	4822 051 10102	1k	2%	0,25W
4648	4822 051 10102	1k	2%	0,25W
4649	4822 051 10102	1k	2%	0,25W
4650	4822 051 10102	1k	2%	0,25W
4651	4822 051 10102	1k	2%	0,25W
4652	4822 051 10102	1k	2%	0,25W
4653	4822 051 20473	47k	5%	0,1W
4658	4822 051 10102	1k	2%	0,25W
4659	4822 051 20221	220R	5%	0,1W
4660	4822 051 10102	1k	2%	0,25W
4661	4822 051 10102	1k	2%	0,25W
4662	4822 051 20472	4k7	5%	0,1W
4663	4822 051 20472	4k7	5%	0,1W
4664	4822 051 20222	2k2	5%	0,1W
4665	4822 051 20103	10k	5%	0,1W
4666	4822 051 20222	2k2	5%	0,1W
4667	4822 051 20472	4k7	5%	0,1W
4670	4822 051 20103	10k	5%	0,1W
4674	4822 051 10102	1k	2%	0,25W
4675	4822 051 20273	27k	5%	0,1W
4678	4822 051 10102	1k	2%	0,25W
4681	4822 051 20472	4k7	5%	0,1W

CHIP RESISTORS

4682	4822 051 10102	1k	2%	0,25W
4683	4822 051 20103	10k	5%	0,1W
4687	4822 051 20472	4k7	5%	0,1W
4688	4822 051 20223	22k	5%	0,1W
4689	4822 051 10102	1k	2%	0,25W
4690	4822 051 20471	470R	5%	0,1W
4691	4822 051 20472	4k7	5%	0,1W
4694	4822 051 10102	1k	2%	0,25W
4696	4822 051 20221	220R	5%	0,1W
4697	4822 051 10102	1k	2%	0,25W
4698	4822 051 20221	220R	5%	0,1W
4699	4822 051 20221	220R	5%	0,1W
4700	4822 051 20221	220R	5%	0,1W
4701	4822 051 10102	1k	2%	0,25W
4702	4822 051 20008	CHIP JUMPER 0805		
4703	4822 051 10102	1k	2%	0,25W
4704	4822 051 10102	1k	2%	0,25W
4705	4822 051 10008	CHIP JUMPER1206		
4710	4822 051 10102	1k	2%	0,25W
4711	4822 051 10102	1k	2%	0,25W
4712	4822 051 10102	1k	2%	0,25W
4713	4822 051 10102	1k	2%	0,25W
4716	4822 051 10102	1k	2%	0,25W
4718	4822 051 20103	10k	5%	0,1W
4719	4822 051 20103	10k	5%	0,1W
4721	4822 051 20104	100k	5%	0,1W
4801	4822 051 10008	CHIP JUMPER1206		
4802	4822 051 20008	CHIP JUMPER 0805		
4803	4822 051 10008	CHIP JUMPER 1206		
7690	4822 051 20008	CHIP JUMPER 0805		

CAPACITORS

2503	4822 124 41407	0,47µF	20%	63V
2504	4822 124 41407	0,47µF	20%	63V
2505	4822 124 40746	0,22µF	20%	63V
2506	4822 124 40746	0,22µF	20%	63V
2507	4822 121 41738	270nF	5%	63V
2508	4822 121 41738	270nF	5%	63V
2509	4822 124 40433	47µF	20%	25V
2511	5322 121 42661	330nF	5%	63V
2512	5322 121 42661	330nF	5%	63V
2517	4822 121 51252	470nF	5%	63V
2518	4822 121 51252	470nF	5%	63V
2519	4822 124 40433	47µF	20%	25V
2520	4822 124 40433	47µF	20%	25V
2521	4822 124 40196	220µF	20%	16V
2523	4822 121 51387	10nF	20%	16V
2524	4822 121 51387	10nF	20%	16V
2525	4822 122 33519	470pF	10%	50V
2526	4822 122 33519	470pF	10%	50V
2529	5322 121 42661	330nF	5%	63V
2530	5322 121 42661	330nF	5%	63V
2537	4822 122 33195	100pF	10%	50V
2541	4822 124 40433	47µF	20%	25V
2542	4822 122 33519	470pF	10%	50V
2550	4822 124 40242	1µF	20%	63V
2552	4822 124 41525	100µF	20%	25V

CAPACITORS

2555	4822 121 42408	220nF	5%	63V
2556	4822 121 42408	220nF	5%	63V
2557	4822 124 40746	0,22µF	20%	63V
2558	4822 124 40746	0,22µF	20%	63V
2560	4822 124 40433	47µF	20%	25V
2561	4822 124 40433	47µF	20%	25V
2563	4822 122 33848	47pF	5%	50V
2564	4822 122 33848	47pF	5%	50V
2565	4822 126 12882	100nF+80/-20%		50V
2566	4822 126 12882	100nF+80/-20%		50V
2579	4822 124 40242	1µF	20%	63V
2580	4822 124 40242	1µF	20%	63V
2588	4822 126 12882	100nF+80/-20%		50V
2589	4822 124 41525	100µF	20%	25V
2637	5322 121 42498	680nF	5%	63V
2638	5322 121 42498	680nF	5%	63V
2641	4822 124 40246	4,7µF	20%	63V
2642	4822 124 40246	4,7µF	20%	63V
2647	4822 124 40246	4,7µF	20%	63V
2648	4822 124 40246	4,7µF	20%	63V
2691	4822 124 40246	4,7µF	20%	63V
2692	4822 124 41584	100µF	20%	10V
2693	4822 124 41525	100µF	20%	25V
2694	4822 124 41525	100µF	20%	25V
2701	4822 122 33195	100pF	10%	50V
2702	4822 122 33195	100pF	10%	50V
2703	4822 122 33195	100pF	10%	50V
2704	4822 122 33195	100pF	10%	50V
2711	4822 122 33195	100pF	10%	50V
2712	4822 122 33195	100pF	10%	50V
2713	4822 124 41579	10µF	20%	50V
2714	4822 124 41579	10µF	20%	50V
2715	4822 124 40196	220µF	20%	16V
2716	4822 124 40196	220µF	20%	16V
2717	4822 126 12339	2,2nF	10%	16V
2718	4822 126 12339	2,2nF	10%	16V
2722	4822 126 13174	33nF	20%	16V
2727	4822 122 10459	560pF	10%	50V
2733	4822 124 41407	0,47µF	20%	63V
2734	4822 124 41407	0,47µF	20%	63V
2735	4822 126 12882	100nF+80/-20%		50V
2761	4822 124 22263	220µF	20%	25V
2762	4822 124 40246	4,7µF	20%	63V
2763	4822 124 40433	47µF	20%	25V
2765	4822 124 40433	47µF	20%	25V
2780	4822 124 40246	4,7µF	20%	63V
2781	4822 121 51387	10nF	20%	16V
2783	5322 121 42386	100nF	5%	63V
2784	4822 121 41934	22nF	10%	100V
2785	4822 124 41579	10µF	20%	50V
2786	4822 122 33195	100pF	10%	50V
2807	4822 126 12339	2,2nF	10%	16V
2831	4822 124 40433	47µF	20%	25V
2832	4822 124 40184	1000µF	20%	10V
2833	4822 124 40433	47µF	20%	25V
2843	4822 124 41407	0,47µF	20%	63V
2844	4822 124 41407	0,47µF	20%	63V
2845	4822 126 12339	2,2nF	10%	16V
2846	4822 126 12339	2,2nF	10%	16V
2848	4822 124 40433	47µF	20%	25V

CAPACITORS

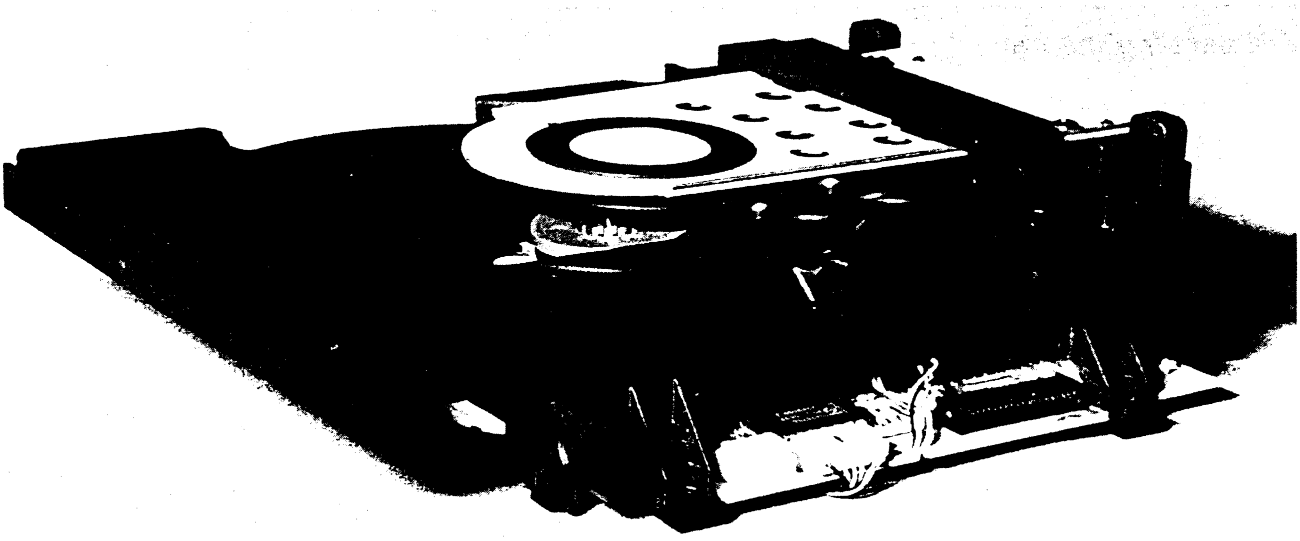
2849	4822 124 40433	47µF	20%	25V
2855	4822 124 40433	47µF	20%	25V
2856	5322 121 42386	100nF	5%	63V
2858	4822 122 33195	100pF	10%	50V
2859	4822 121 51387	10nF	20%	16V

CHIP CAPACITORS

2501	4822 122 33336	8,2nF	10%	50V
2502	4822 122 33336	8,2nF	10%	50V
2513	4822 122 32646	5,6nF	10%	50V
2514	4822 122 32646	5,6nF	10%	50V
2515	4822 122 33342	33nF	10%	63V
2516	4822 122 33342	33nF	10%	63V
2527	5322 122 32531	100pF	5%	50V
2528	5322 122 32531	100pF	5%	50V
2531	5322 122 31865	1,5nF	10%	63V
2532	5322 122 31865	1,5nF	10%	63V
2533	5322 122 32481	15pF	5%	50V
2534	5322 122 32481	15pF	5%	50V
2535	5322 122 32448	10pF	5%	50V
2536	5322 122 32448	10pF	5%	50V
2538	5322 122 32531	100pF	5%	50V
2539	4822 126 10002	100nF	20%	50V
2540	4822 122 31797	22nF	10%	63V
2553	4822 122 33175	2,2nF	20%	50V
2559	4822 122 33177	10nF	20%	50V
2573	5322 122 32531	100pF	5%	50V
2574	5322 122 32531	100pF	5%	50V
2581	5322 122 32531	100pF	5%	50V
2582	5322 122 32531	100pF	5%	50V
2583	4822 122 33342	33nF	10%	63V
2584	4822 122 33342	33nF	10%	63V
2585	5322 122 32531	100pF	5%	50V
2586	5322 122 32531	100pF	5%	50V
2590	4822 122 33177	10nF	20%	50V
2591	4822 122 33177	10nF	20%	50V
2631	4822 122 32541	27nF	10%	63V
2632	4822 122 32541	27nF	10%	63V
2633	4822 126 13057	220nF	10%	25V
2634	4822 126 13057	220nF	10%	25V
2635	4822 122 33891	3,3nF	10%	63V
2636	4822 122 33891	3,3nF	10%	63V
2639	5322 122 32531	100pF	5%	50V
2640	5322 122 32531	100pF	5%	50V
2643	4822 122 33177	10nF	20%	50V
2644	4822 122 33177	10nF	20%	50V
2645	5322 122 32448	10pF	5%	50V
2646	5322 122 32448	10pF	5%	50V
2705	5322 122 32531	100pF	5%	50V
2706	5322 122 32531	100pF	5%	50V
2707	5322 122 34099	470pF	10%	63V
2708	5322 122 34099	470pF	10%	63V
2709	5322 122 32531	100pF	5%	50V
2710	5322 122 32531	100pF	5%	50V
2719	4822 122 33893	18nF	10%	63V
2720	4822 122 33893	18nF	10%	63V
2721	4822 122 33342	33nF	10%	63V
2723	4822 126 10326	180pF	5%	
2724	4822 126 10326	180pF	5%	
2725	4822 122 33575	220pF	5%	50V
2726	4822 122 33575	220pF	5%	50V
2728	4822 122 33173	560pF	10%	63V

CHIP CAPACITORS

2729	4822 122 32541	27nF	10%	63V
2730	4822 122 32541	27nF	10%	63V
2737	4822 126 10002	100nF	20%	50V
2738	4822 126 10002	100nF	20%	50V
2752	5322 122 32654	22nF	10%	63V
2760	4822 126 10002	100nF	20%	50V
2782	5322 122 31866	6,8nF	10%	63V
2787	4822 122 33342	33nF	10%	63V
2794	4822 126 10002	100nF	20%	50V
2834	5322 126 10794	220pF	10%	
2835	5322 126 10794	220pF	10%	
2836	5322 126 10794	220pF	10%	
2837	5322 126 10794	220pF	10%	
2838	5322 126 10794	220pF	10%	
2839	5322 126 10794	220pF	10%	
2840	4822 122 33496	100nF	10%	63V
2850	5322 122 32658	22pF	5%	50V
2851	5322 122 32654	22nF	10%	63V
2852	5322 122 32452	47pF	5%	50V



CD SHORT LOADER UNIT

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Dismantling hints 10-2
Disassembly drawings 10-2
Functional Diagram 10-5

CD IF Board

- Circuit Diagram 10-6
- Component Layout 10-7

Exploded view 10-8
Partslist 10-9

Dismantling hints CD Short Loader

Dismantling the tray

a) Press open/close button to open the tray. If the tray doesn´t work, use a small screwdriver as shown in Fig.1 point 1 to move the tray outside. After the first centimetre it is possible to pull the tray out by hand.

b) Release two snaps and remove tray.

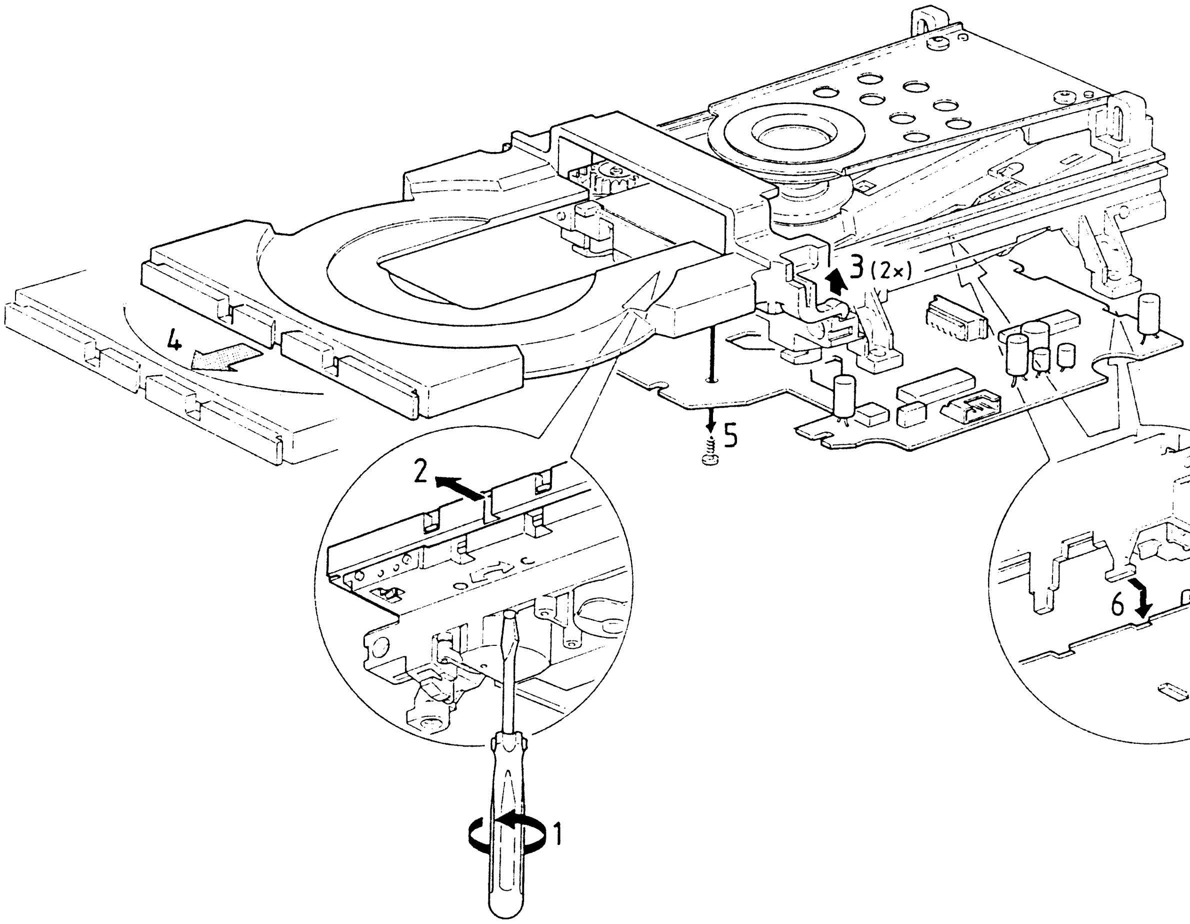


Fig. 1

Assembly of gear

a) Use a pin (e.g. a paperclip) to align the cam wheel (a) withthe gear wheel (b). See Fig. 2.

b) Fix the wheels with the small plastic whashers.

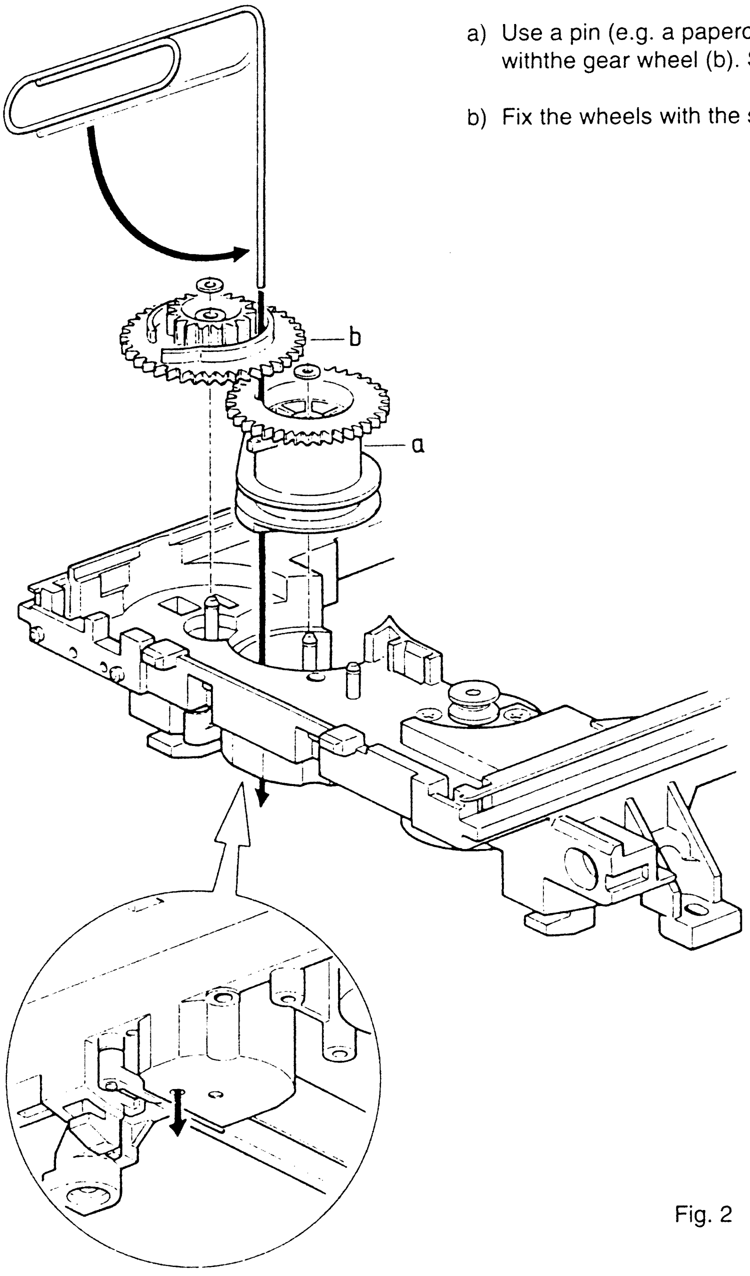


Fig. 2

c) Mount idle wheel 2 (c) and idle wheel 1 (d) in any position. See Fig. 3.

d) Fix the idle wheel 1 (d) with the small plastic whasher.

e) Mount the driving belt.

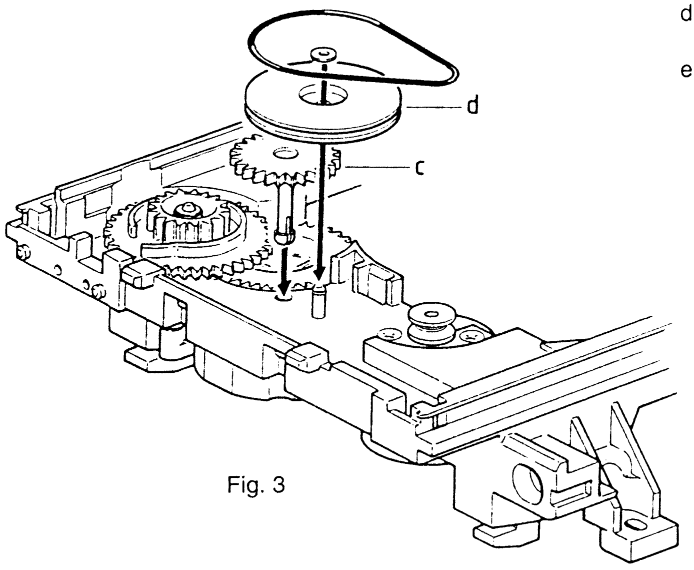


Fig. 3

f) Mount the pinion guiding assy and the cover as shown in Fig. 4.

g) Turn the gear wheel (b) counter clockwise to endposition.

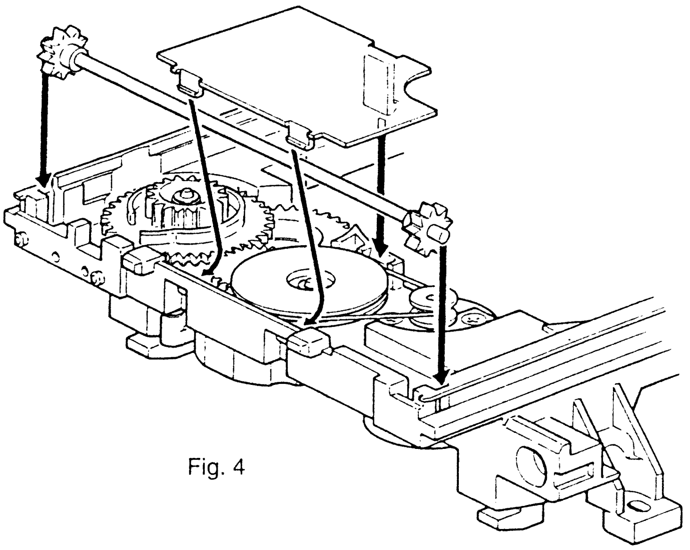


Fig. 4

h) Mount the CD Mechanism as shown in Fig. 5.

i) Mount the tray (Align the tray to the chassis and push it inside).

Check if tray mechanism works correctly!

1) Turn the gear wheel (b) clockwise to its endposition (Use a small screwdriver as shown in Fig. 1 point 1).

   The tray has to move to inner position first and then the CD mechanism has to move to its upper position.

2) Turn the gear wheel (b) counter clockwise to its endposition.

   The CD Mechanism has to move to its lower position first and then the tray has to move outside.

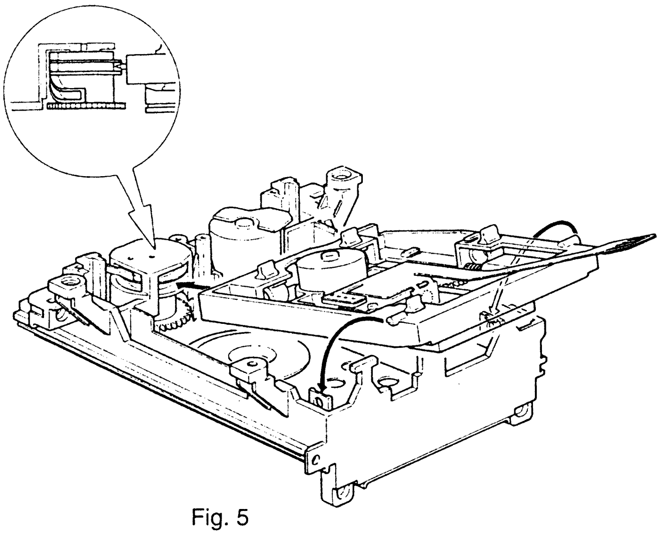
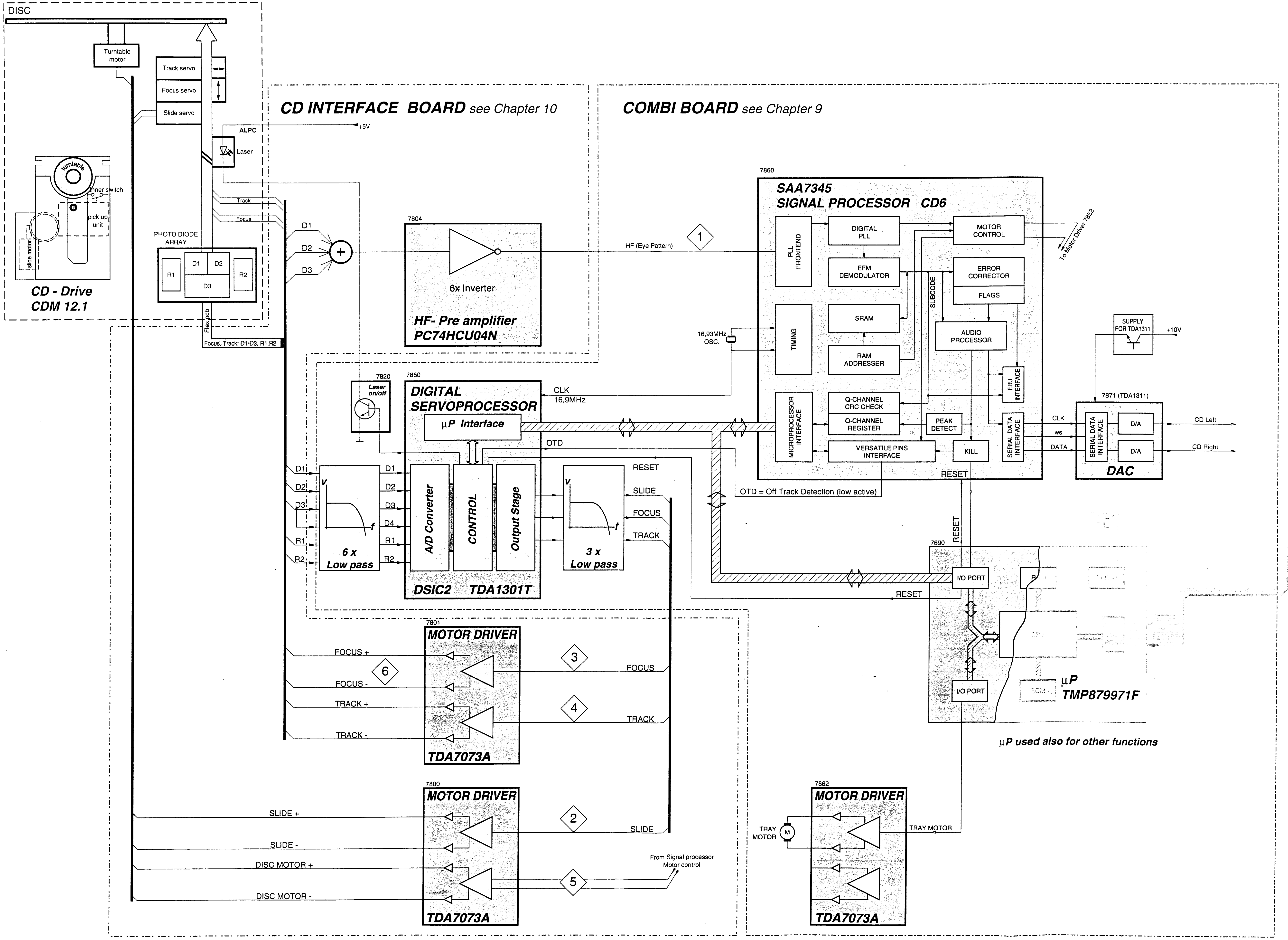
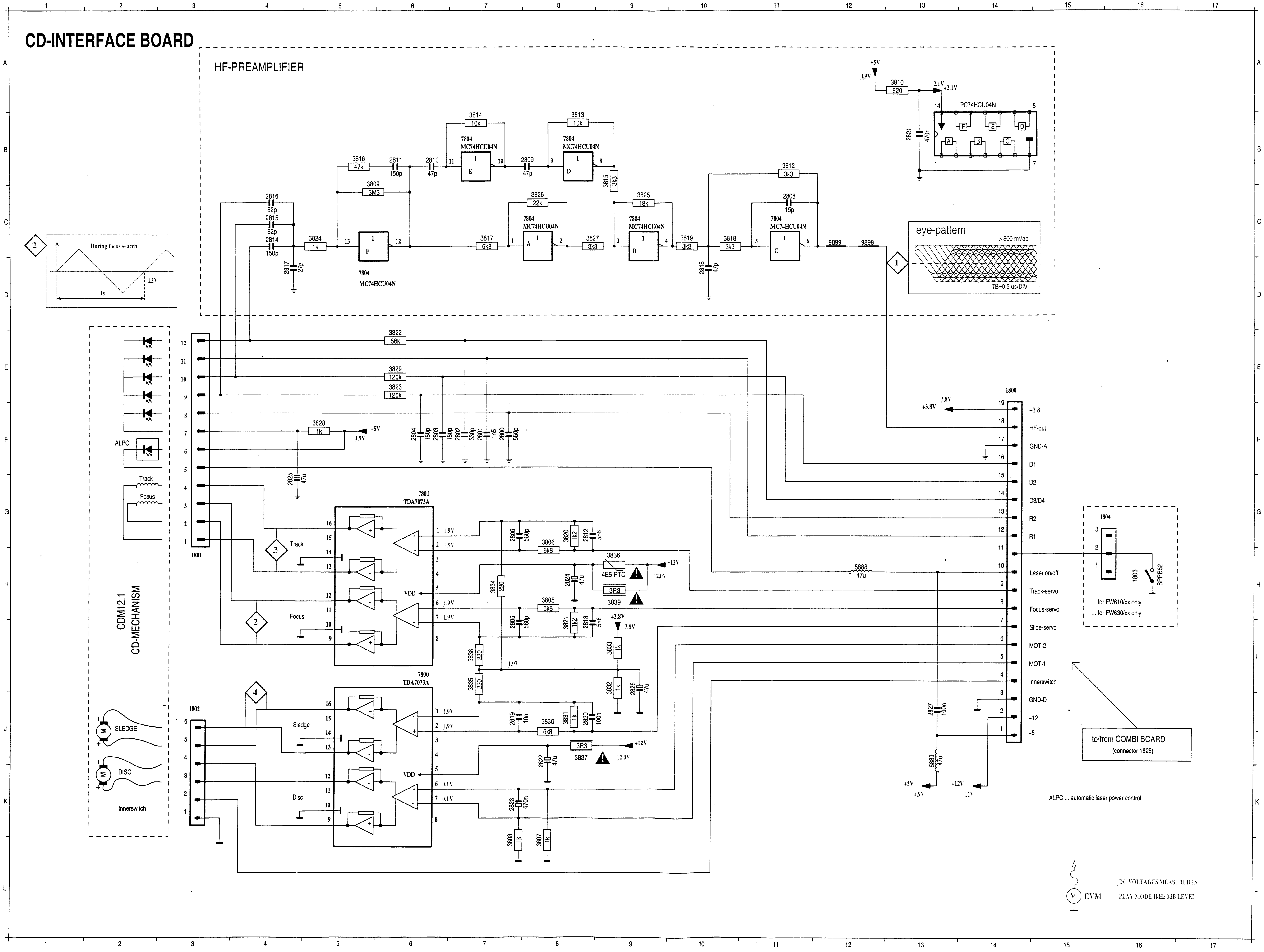


Fig. 5

FUNCTIONAL DIAGRAM *CD Short Loader Module*


DISC
Turntable motor
Track servo
Focus servo
Slide servo
ALPC
+5V
Laser
turntable
inner switch
pick up unit
slide motor
CD - Drive
CDM 12.1
PHOTO DIODE ARRAY
D1
D2
D3
R1
R2
Track
Focus
Flex pcb
Focus, Track, D1-D3, R1,R2
CD INTERFACE BOARD see Chapter 10
COMBI BOARD see Chapter 9
7804
6x Inverter
HF- Pre amplifier
PC74HCU04N
HF (Eye Pattern)
1
7860
SAA7345
SIGNAL PROCESSOR CD6
PLL FRONTEND
DIGITAL PLL
EFM DEMODULATOR
SRAM
RAM ADDRESSER
TIMING
MOTOR CONTROL
ERROR CORRECTOR
FLAGS
SUBCODE
AUDIO PROCESSOR
EBU INTERFACE
MICROPROCESSOR INTERFACE
Q-CHANNEL CRC CHECK
Q-CHANNEL REGISTER
PEAK DETECT
VERSATILE PINS INTERFACE
KILL
SERIAL DATA INTERFACE
To Motor Driver 7862
16,93MHz OSC.
RESET
SUPPLY FOR TDA1311
+10V
7871 (TDA1311)
CLK
WS
DATA
SERIAL DATA INTERFACE
D/A
D/A
DAC
CD Left
CD Right
7820
Laser on/off
7850
DIGITAL SERVOPROCESSOR
µP Interface
CLK 16,9MHz
OTD
OTD = Off Track Detection (low active)
D1
D2
D3
D4
R1
R2
6 x Low pass
A/D Converter
CONTROL
Output Stage
3 x Low pass
RESET
SLIDE
FOCUS
TRACK
DSIC2 TDA1301T
RESET
7690
I/O PORT
I/O PORT
µP TMP879971F
µP used also for other functions
7801
MOTOR DRIVER
FOCUS +
FOCUS -
TRACK +
TRACK -
6
3
4
FOCUS
TRACK
TDA7073A
7800
MOTOR DRIVER
SLIDE +
SLIDE -
DISC MOTOR +
DISC MOTOR -
2
5
SLIDE
From Signal processor Motor control
TDA7073A
7862
MOTOR DRIVER
TRAY MOTOR
M
TRAY MOTOR
TDA7073A

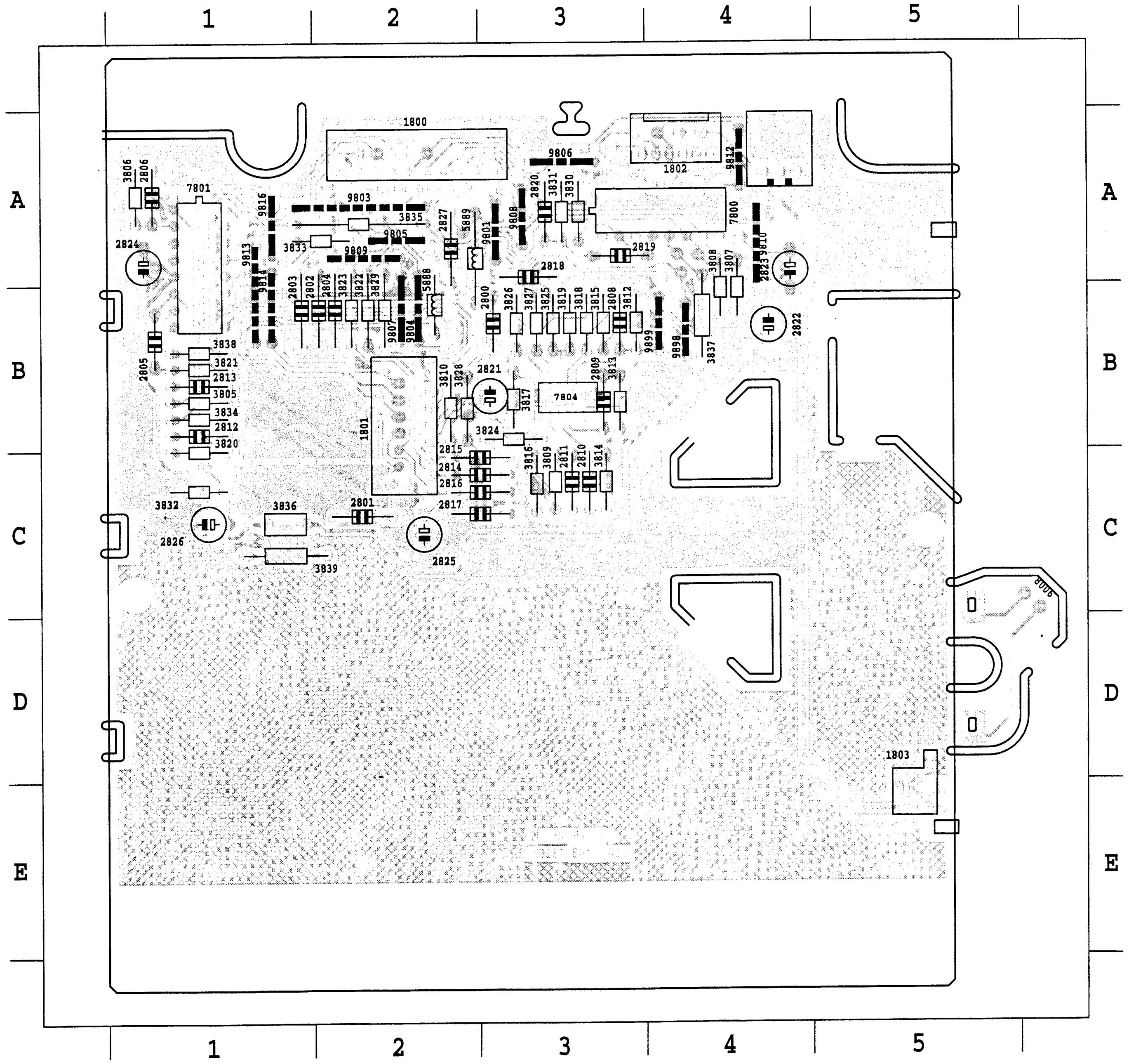
CD-INTERFACE BOARD


HF-PREAMPLIFIER
7804 MC74HCU04N
PC74HCU04N
eye-pattern
> 800 mVpp
TB=0.5 us/DIV
During focus search
1s
±2V
CDM12.1 CD-MECHANISM
ALPC
Track
Focus
SLEDGE
DISC
Innerswitch
1801
1802
1800
1804
7801 TDA7073A
7800 TDA7073A
Sledge
Disc
VDD
4E6 PTC
+3.8
HF-out
GND-A
D1
D2
D3/D4
R2
R1
Laser on/off
Track-servo
Focus-servo
Slide-servo
MOT-2
MOT-1
Innerswitch
GND-D
+12
+5
SPPB62
... for FW610/xx only
... for FW630/xx only
to/from COMBI BOARD
(connector 1825)
ALPC ... automatic laser power control
EVM
DC VOLTAGES MEASURED IN
PLAY MODE 1kHz 0dB LEVEL

1800	E14
1801	H 3
1802	J 3
1803	H16
1804	G15
2800	F 7
2801	F 7
2802	F 7
2803	F 6
2804	F 6
2805	I 7
2806	G 7
2808	C11
2809	B 8
2810	B 6
2811	B 6
2812	G 8
2813	I 8
2814	C 4
2815	C 4
2816	C 4
2817	D 4
2818	D10
2819	J 7
2820	J 8
2821	B13
2822	J 8
2823	K 7
2824	H 8
2825	G 4
2826	I 9
2827	J13
3805	H 8
3806	G 8
3807	L 8
3808	L 7
3809	C 5
3810	A13
3812	B11
3813	B 8
3814	B 7
3815	B 9
3816	B 5
3817	C 7
3818	C10
3819	C10
3820	G 8
3821	I 8
3822	E 6
3823	E 6
3824	C 5
3825	C 9
3826	C 8
3827	C 8
3828	F 5
3829	E 6
3830	J 8
3831	J 8
3832	I 9
3833	I 9
3834	H 7
3835	I 7
3836	H 9
3837	J 8
3838	I 7
3839	H 9
5888	H12
5889	J13
7800	I 6
7801	G 6
7804	C 7
7804	C 9
7804	C11
7804	B 8
7804	B 7
7804	D 5
9898	C12
9899	C12
T350	E 4
T351	E 4
T352	E 4
T353	E 4
T354	F 4
T355	F 4
T356	F 4
T357	F 4
T358	G 4
T359	G 3
T360	G 3
T361	G 4
T362	J 3
T363	J 3
T364	J 3
T365	K 3
T366	J14
T367	K14
T368	I14
T369	I14
T370	I14
T371	I14
T372	H14
T373	H14
T374	H14
T375	F14
T376	G14
T377	G14
T378	G14
T379	F14
T380	F14
T381	F14
T382	G15
T383	A13
T385	I 9
T386	H 7
T387	J 7
T388	E14

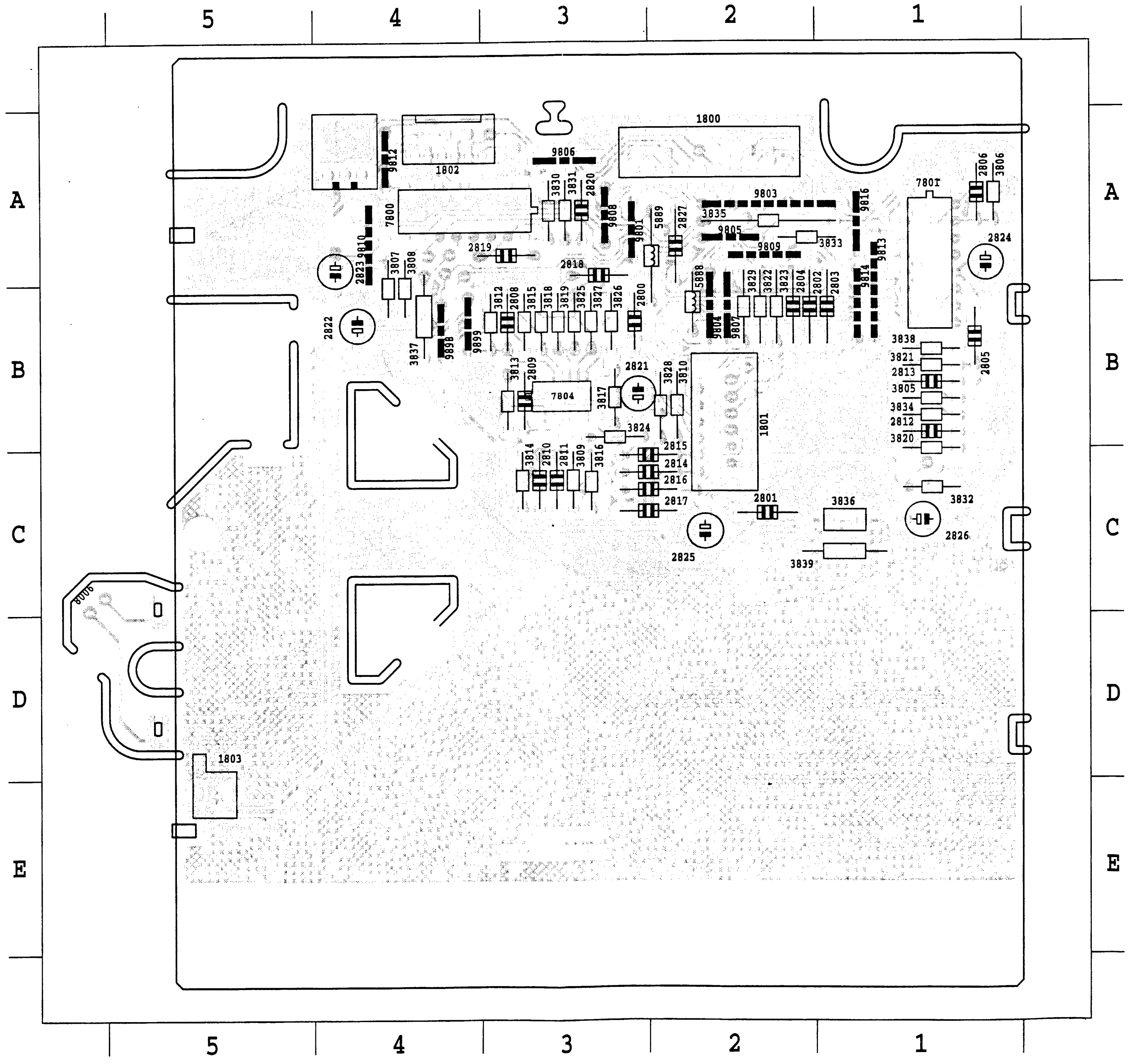
1800 A 2	2805 B 1	2816 C 3	2826 C 1	3814 C 3	3824 B 3	3834 B 1	7804 B 3	9812 A 4
1801 B 2	2806 A 1	2817 C 3	2827 A 2	3815 B 3	3825 B 3	3835 A 2	9801 A 3	9813 B 1
1802 A 4	2808 B 3	2818 A 3	3805 B 1	3816 C 3	3826 B 3	3836 C 1	9803 A 2	9814 B 1
1803 E 5	2809 B 3	2819 A 3	3806 A 1	3817 B 3	3827 B 3	3837 B 4	9804 B 2	9816 A 1
1804 A 4	2810 C 3	2820 A 3	3807 B 4	3818 B 3	3828 B 2	3838 B 1	9805 A 2	9898 B 4
2800 B 3	2811 C 3	2821 B 3	3808 B 4	3819 B 3	3829 B 2	3839 C 1	9806 A 3	9899 B 4
2801 C 2	2812 B 1	2822 B 4	3809 C 3	3820 C 1	3830 A 3	5888 B 2	9807 B 2	
2802 B 2	2813 B 1	2823 A 4	3810 B 2	3821 B 1	3831 A 3	5889 A 2	9808 A 3	
2803 B 1	2814 C 3	2824 A 1	3812 B 3	3822 B 2	3832 C 1	7800 A 4	9809 A 2	
2804 B 2	2815 C 3	2825 C 2	3813 B 3	3823 B 2	3833 A 2	7801 A 1	9810 A 4	

Componentside view

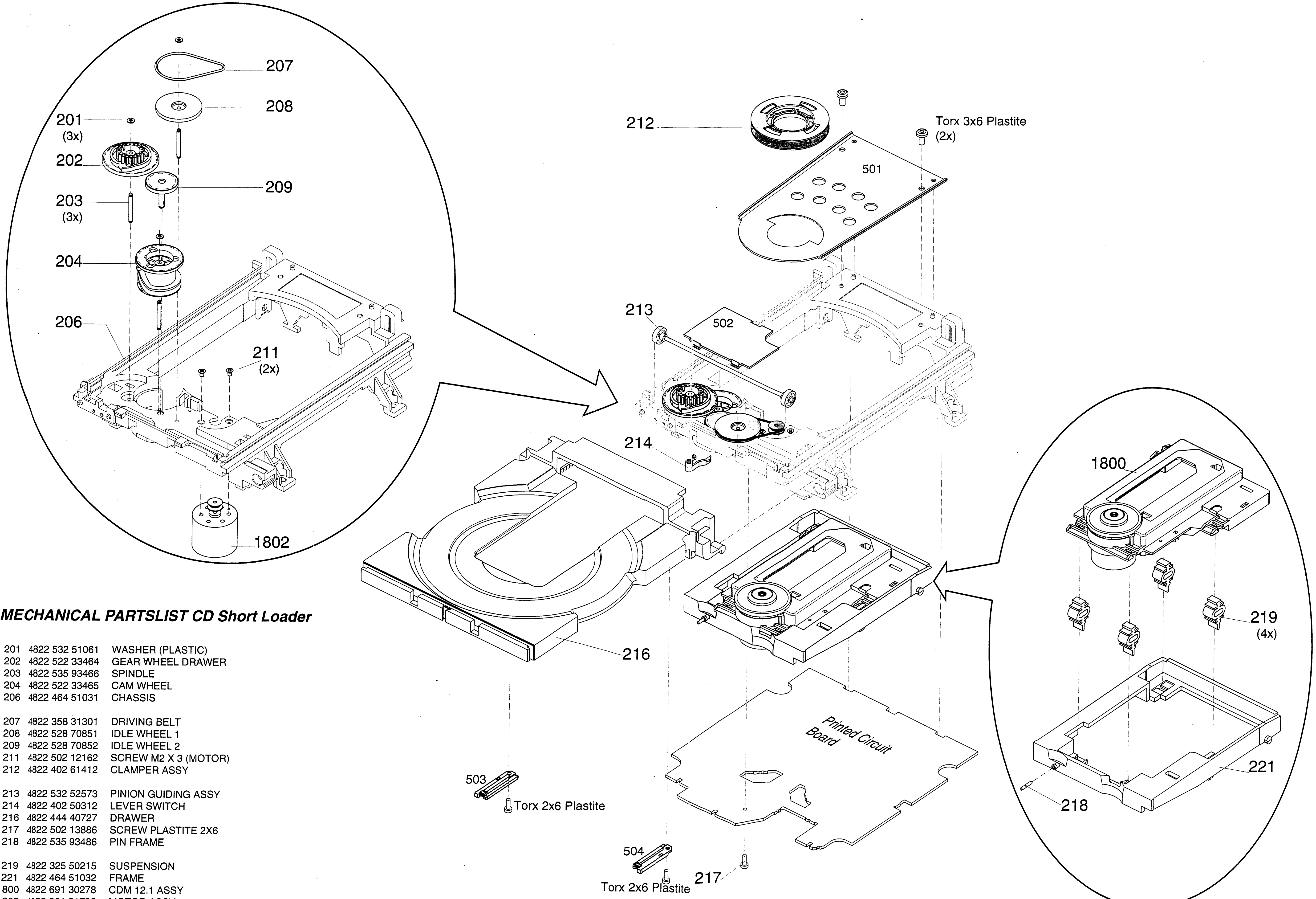

1
2
3
4
5
A
B
C
D
E
1800
1801
1802
1803
7800
7801
7804
9803
9805
9806
9809
2824
2826
2825
2821
2822
3836
3839
3832
3838
3821
2813
3805
3834
2812
3820

1800 A 2	2805 B 1	2816 C 3	2826 C 1	3814 C 3	3824 B 3	3834 B 1	7804 B 3	9812 A 4
1801 B 2	2806 A 1	2817 C 3	2827 A 2	3815 B 3	3825 B 3	3835 A 2	9801 A 3	9813 B 1
1802 A 4	2808 B 3	2818 A 3	3805 B 1	3816 C 3	3826 B 3	3836 C 1	9803 A 2	9814 B 1
1803 E 5	2809 B 3	2819 A 3	3806 A 1	3817 B 3	3827 B 3	3837 B 4	9804 B 2	9816 A 1
1804 A 4	2810 C 3	2820 A 3	3807 B 4	3818 B 3	3828 B 2	3838 B 1	9805 A 2	9898 B 4
2800 B 3	2811 C 3	2821 B 3	3808 B 4	3819 B 3	3829 B 2	3839 C 1	9806 A 3	9899 B 4
2801 C 2	2812 B 1	2822 B 4	3809 C 3	3820 C 1	3830 A 3	5888 B 2	9807 B 2	
2802 B 2	2813 B 1	2823 A 4	3810 B 2	3821 B 1	3831 A 3	5889 A 2	9808 A 3	
2803 B 1	2814 C 3	2824 A 1	3812 B 3	3822 B 2	3832 C 1	7800 A 4	9809 A 2	
2804 B 2	2815 C 3	2825 C 2	3813 B 3	3823 B 2	3833 A 2	7801 A 1	9810 A 4	

Copperside view


5
4
3
2
1
A
B
C
D
E
1800
1801
1802
1803
7800
7801
7804
9803
9805
9806
9809
2824
2826
2825
2821
2822
3836
3839
3832
3838
3821
2813
3805
3834
2812
3820

Exploded view CD Short Loader


207
208
201
(3x)
202
209
203
(3x)
204
206
211
(2x)
1802
212
Torx 3x6 Plastite
(2x)
501
213
502
214
1800
216
219
(4x)
Printed Circuit Board
221
218
503
Torx 2x6 Plastite
504
Torx 2x6 Plastite
217

MECHANICAL PARTSLIST CD Short Loader

201	4822 532 51061	WASHER (PLASTIC)
202	4822 522 33464	GEAR WHEEL DRAWER
203	4822 535 93466	SPINDLE
204	4822 522 33465	CAM WHEEL
206	4822 464 51031	CHASSIS
207	4822 358 31301	DRIVING BELT
208	4822 528 70851	IDLE WHEEL 1
209	4822 528 70852	IDLE WHEEL 2
211	4822 502 12162	SCREW M2 X 3 (MOTOR)
212	4822 402 61412	CLAMPER ASSY
213	4822 532 52573	PINION GUIDING ASSY
214	4822 402 50312	LEVER SWITCH
216	4822 444 40727	DRAWER
217	4822 502 13886	SCREW PLASTITE 2X6
218	4822 535 93486	PIN FRAME
219	4822 325 50215	SUSPENSION
221	4822 464 51032	FRAME
1800	4822 691 30278	CDM 12.1 ASSY
1802	4822 361 21708	MOTOR ASSY
	4822 502 30735	SCREW 3 X 6 PLASTITE

ELECTRICAL PARTSLIST CD INTERFACE BOARD

MISCELLANEOUS

1800	4822 267 60412	FLEX PRINT CONNECTOR
1803	4822 276 13503	SWITCH

INTEGRATED CIRCUITS

7800	4822 209 32852	TDA7073A/N2
7801	4822 209 32852	TDA7073A/N2
7804	5322 209 11517	PC74HCU04T

COILS

5888	4822 157 53906	47μH	10%
5889	4822 157 53906	47μH	10%

RESISTORS

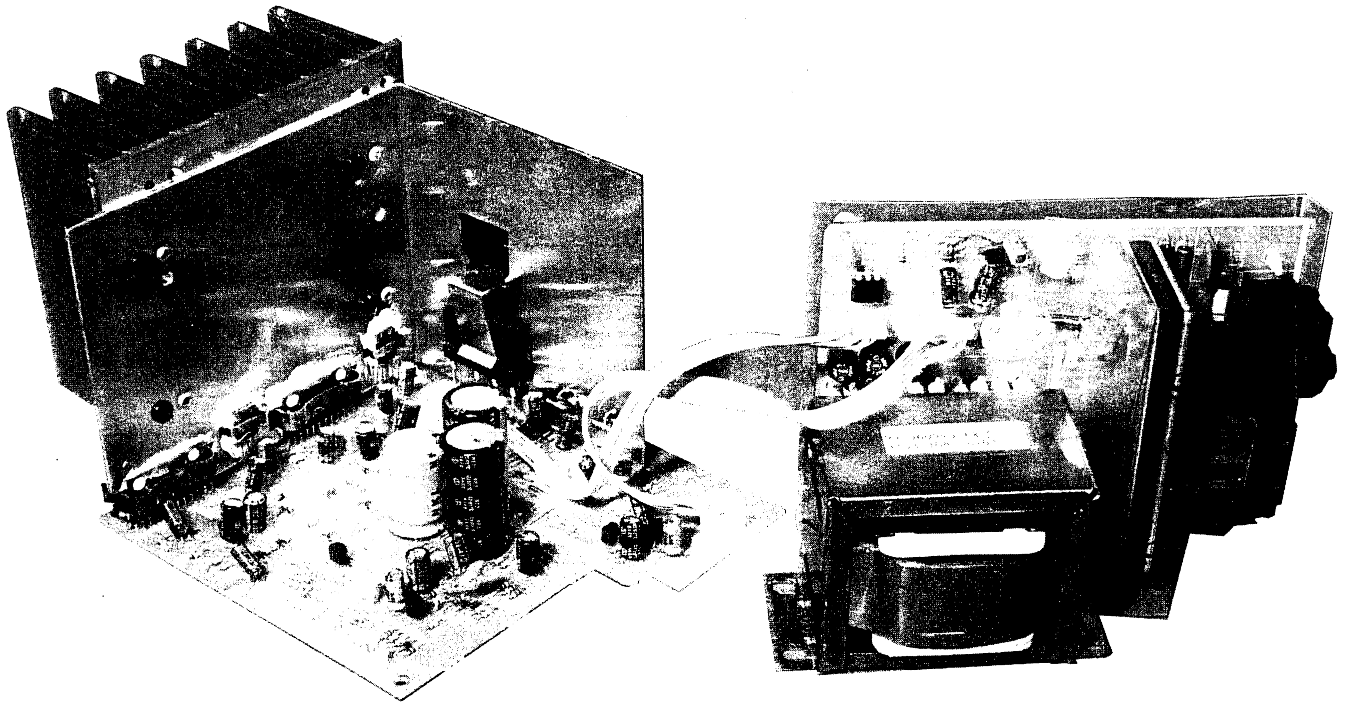
3805	4822 116 52296	6k8	5%	0,5W
3806	4822 116 52296	6k8	5%	0,5W
3807	4822 050 11002	1k	5%	0,2W
3808	4822 050 11002	1k	5%	0,2W
3809	4822 111 50499	3M3	5%	0,2W
3810	4822 116 52231	820R	5%	0,5W
3812	4822 116 52269	3k3	5%	0,5W
3813	4822 116 83864	10k	5%	0,5W
3814	4822 116 83864	10k	5%	0,5W
3815	4822 116 52269	3k3	5%	0,5W
3816	4822 116 52284	47k	5%	0,5W
3817	4822 116 52296	6k8	5%	0,5W
3818	4822 116 52269	3k3	5%	0,5W
3819	4822 116 52269	3k3	5%	0,5W
3820	4822 116 52207	1k2	5%	0,5W
3821	4822 116 52207	1k2	5%	0,5W
3822	4822 116 52291	56k	5%	0,5W
3823	4822 116 52239	120k	5%	0,5W
3824	4822 050 11002	1k	5%	0,2W
3825	4822 116 52251	18k	5%	0,5W
3826	4822 116 52257	22k	5%	0,5W
3827	4822 116 52269	3k3	5%	0,5W
3828	4822 050 11002	1k	5%	0,2W
3829	4822 116 52239	120k	5%	0,5W
3830	4822 116 52296	6k8	5%	0,5W
3831	4822 050 11002	1k	5%	0,2W
3832	4822 050 11002	1k	5%	0,2W
3833	4822 050 11002	1k	5%	0,2W
3834	4822 116 52215	220R	5%	0,16W
3835	4822 116 52215	220R	5%	0,16W
3836	4822 116 40227	PTC	4R6	
3837	4822 052 10338	3R3		NFR25
3838	4822 116 52215	220R	5%	0,16W

CAPACITORS

2800	4822 122 10459	560pF	10%	50V
2801	4822 126 12878	1,5nF	10%	16V
2802	4822 126 12787	330pF	10%	50V
2803	4822 126 10053	180pF	10%	50V
2804	4822 126 10053	180pF	10%	50V
2805	4822 122 10459	560pF	10%	50V
2806	4822 122 10459	560pF	10%	50V
2808	4822 122 10462	15pF	5%	50V
2809	4822 122 33848	47pF	5%	50V

CAPACITORS

2810	4822 122 33848	47pF	5%	50V
2811	4822 122 33849	150pF	10%	50V
2812	4822 126 13098	5,6nF	20%	16V
2813	4822 126 13098	5,6nF	20%	16V
2814	4822 122 33849	150pF	10%	50V
2815	4822 122 10319	82pF	5%	50V
2816	4822 122 10319	82pF	5%	50V
2817	4822 122 33192	27pF	5%	50V
2818	4822 122 33848	47pF	5%	50V
2819	4822 121 51387	10nF	20%	16V
2820	4822 126 12882	100nF	20%	50V
2821	4822 124 41407	0,47μF	20%	63V
2822	4822 124 40433	47μF	20%	25V
2823	4822 124 40999	0,47μF	20%	50V
2824	4822 124 40433	47μF	20%	25V
2825	4822 124 40433	47μF	20%	25V
2826	4822 124 40433	47μF	20%	25V
2827	4822 126 12882	100nF	20%	50V



POWER BOARD

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Component layout 11-2
Circuit diagram Supply part 11-3
Component layout 11-4
Circuit diagram Power stage 11-5
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CIRCUIT DESCRIPTION

The mains transformer 1008 is fed with a preregulated voltage. The preregulation is done by a power MOSFET 7351. To be able to handle AC, the voltage for the FET is rectified by a diode bridge 6351, 6352, 6353 and 6354. The control of the MOSFET is depending of the mode of the set.

In Power on mode the MOSFET is controled by the optocoupler 7353 via resistor 3345. The supply for the optocoupler is created via resistor 3343 and the diode 6344. Stabilisation and filtering is done by the zenerdiode 6345 and the elcap 2343. The optocoupler is activated by the transistor 7369. The emitter of this transistor is connected to the stabilized voltage +5,6V via resistor 3386. The base is connected via zenerdiode 6384 and resistor 3383 to the voltage +16V. This enables the transistor to compare the voltage +16V with the voltage +5,6V. In case of a too low +16V the transistor conducts and makes via the optocoupler also the MOSFET conducting. In case of a too high +16V both semiconductors become nonconducting.

To provide sufficient stability in the whole control loop, some measures are taken. On the primary side a feed back via resistor 3341 and diode 6341 reduces the overall gain. On the secondary side the resistor 3386 works in similar way. The RC network 2379/3379 reduces the AC gain while the DC gain remains unaffected.

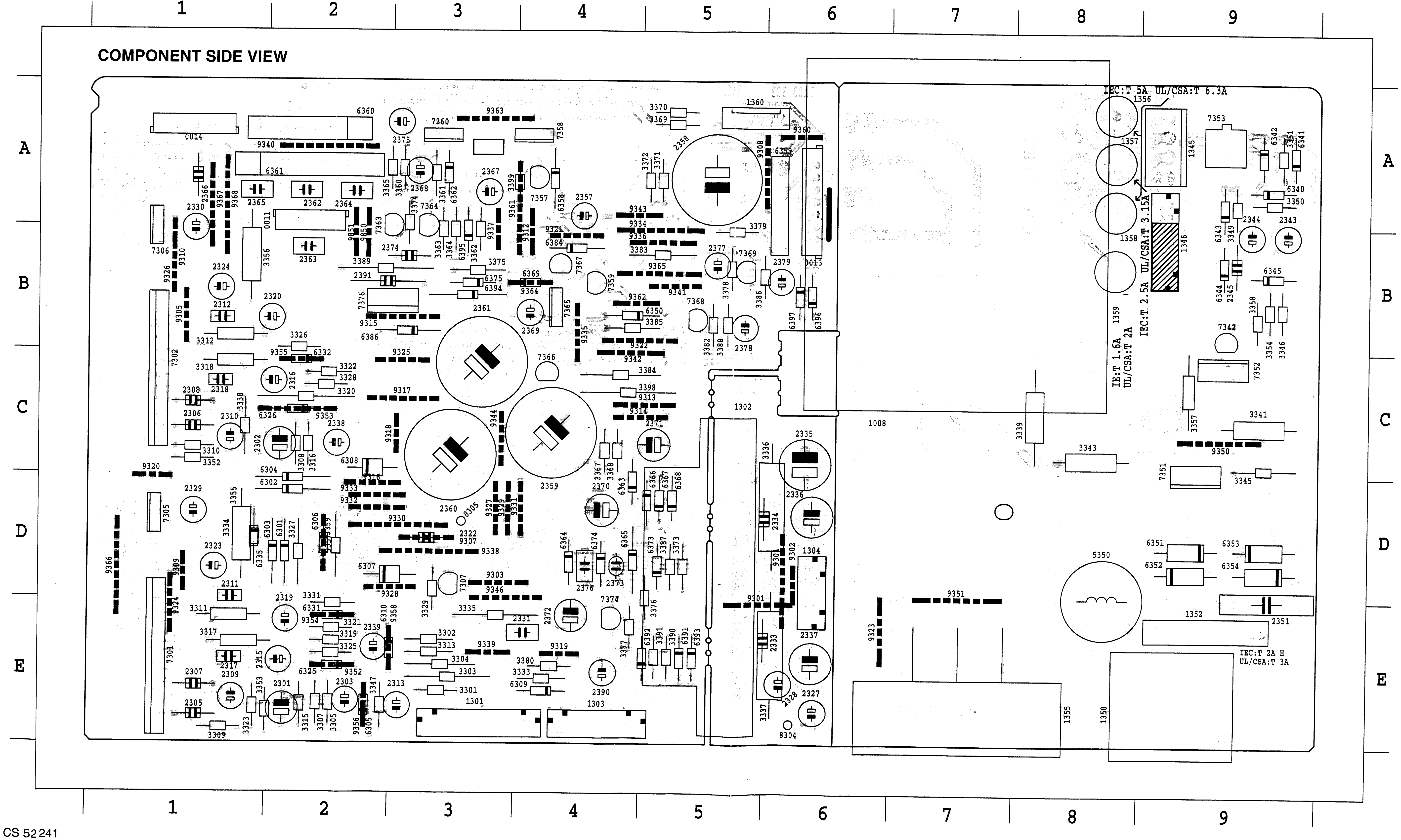
Transients could cause too high current peaks in the FET. To safeguard the FET, the current is sensed by the resistor 3357 and the transistor 7342. In case of overcurrent the thyristor 7352 fires and bypass the FET.
To avoid a too high supply in case of fault condition the thyristor 7376 is used as a crowbar device. The zenerdiode 6386 senses the voltage +24V and fires the thyristor in case of excessive voltage. The fuses will be blown.

In the ECO mode (Stand by and display off) it is only necessary to supply the microprocessor and the infrared eye. This can be done with a drastically reduced voltage on the transformer. To activate that mode, the line STBY is switched by the microprocessor to ground. This makes the transistor 7366 conducting. As a consequence the +12V stabilisation, realized by transistors 7360, 7363 and 7364, is switched off. Additional the transistor 7368 is conducting and switches transistor 7369 off. The control loop via the optocoupler is now cut off. The control is working only with components connected to the primary side of the transformer. Via the diode 6344 still a stabilized voltage of 12V is created. The voltage at the anode of the diode 6344 is during one half cycle about +12V and during the other half cycle below zero depending on the voltage across the transformer.

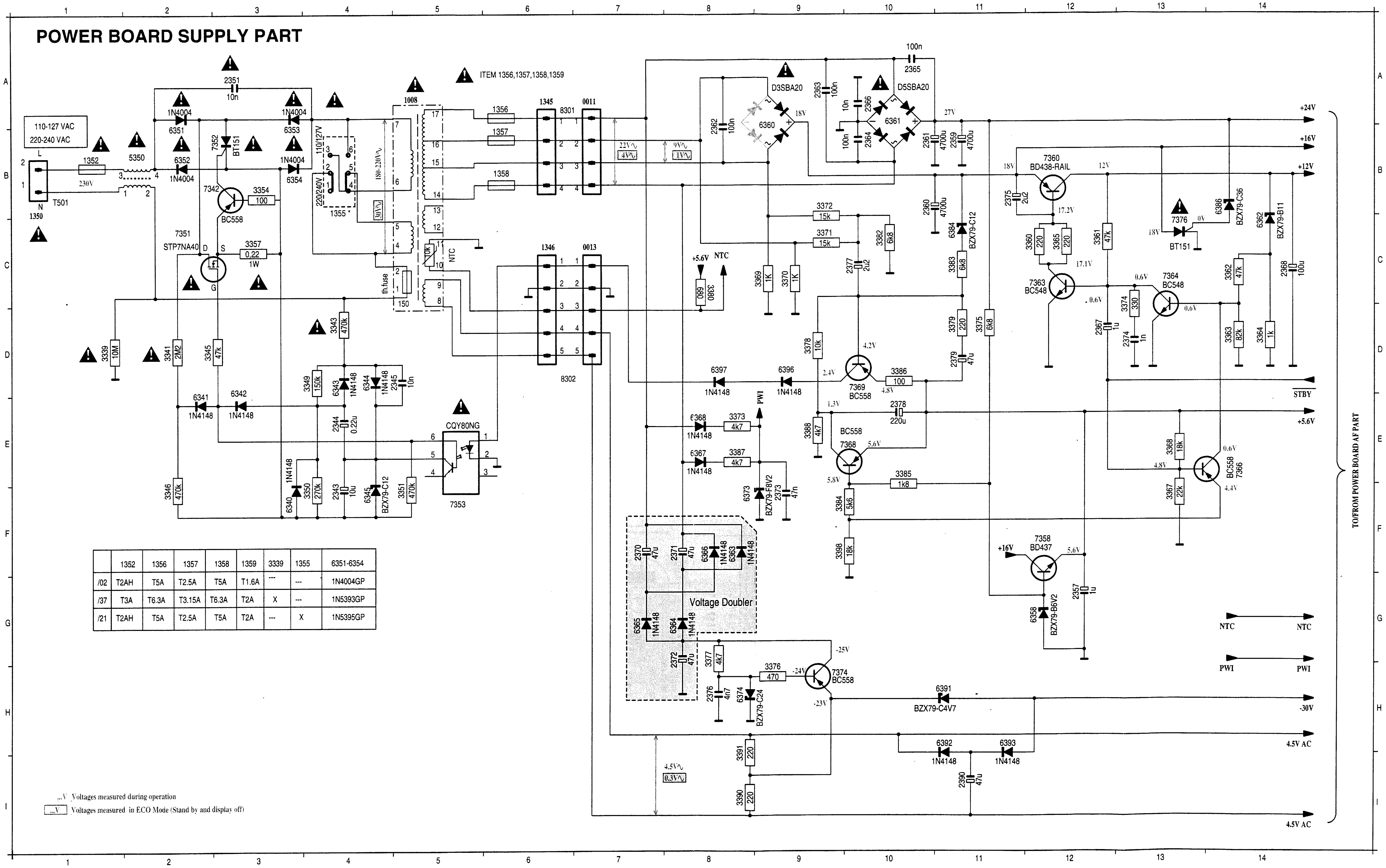
Integration by resistor 3349 and capacitor 2344 results a triangle voltage, fed via diode 6342 to the gate of the FET. The positive peak happens at the zero crossing of the mains, switching on the FET for a short time. The average DC level is depending on the transformer voltage. Increasing transformer voltage shifts the DC level to negative. This is reducing the conduction time of the FET.

0011 A 2	1357 A 8	2312 B 1	2330 B 1	2358 A 5	2372 E 4	3305 E 2	3321 E 2	3338 C 1	3356 B 1	3371 A 5	3386 B 5	6306 D 2	6344 B 9	6365 D 4	6395 B 3	7359 B 4	9302 D 6	9318 C 3	9332 D 2	9350 C 9	9365 B 5
0013 A 6	1358 A 8	2313 E 3	2331 E 4	2359 C 4	2373 D 4	3307 E 2	3322 C 2	3339 C 8	3357 C 9	3372 A 5	3387 D 5	6307 D 2	6345 B 9	6366 D 5	6396 B 6	7360 A 3	9303 D 3	9319 E 4	9333 D 2	9351 D 7	9366 D 1
0014 A 1	1359 B 8	2315 E 2	2333 E 5	2360 C 3	2374 B 3	3308 C 2	3323 E 1	3341 C 9	3358 B 9	3373 D 5	3388 B 5	6308 C 2	6350 B 4	6367 D 5	6397 B 6	7363 B 2	9304 D 6	9320 D 1	9334 B 5	9352 E 2	9367 A 1
1008 B 7	1360 A 5	2316 C 2	2334 D 5	2361 C 3	2375 A 3	3309 E 1	3325 E 2	3343 C 8	3359 D 2	3374 A 3	3389 B 2	6309 E 4	6351 D 9	6368 D 5	7301 E 1	7364 B 3	9305 B 1	9321 B 4	9335 B 4	9353 C 2	9368 A 1
1301 E 3	2301 E 2	2317 E 1	2335 C 6	2362 A 2	2376 D 4	3310 C 1	3326 B 2	3345 C 9	3360 A 3	3375 B 3	3390 E 5	6310 E 2	6352 D 9	6369 B 4	7302 C 1	7365 B 4	9307 D 3	9322 B 4	9336 B 5	9354 E 2	9850 B 2
1302 D 5	2302 C 2	2318 C 1	2336 D 6	2363 B 2	2377 B 5	3311 E 1	3327 D 2	3346 B 9	3361 A 3	3376 D 5	3391 E 5	6325 E 2	6353 D 9	6373 D 5	7305 D 1	7366 C 4	9308 A 5	9323 E 6	9337 B 3	9355 C 2	9851 B 2
1303 E 4	2303 E 2	2319 E 2	2337 E 6	2364 A 2	2378 B 5	3312 B 1	3328 C 2	3347 E 2	3362 B 3	3377 E 4	3398 C 4	6326 C 2	6354 D 9	6374 D 4	7306 B 1	7367 B 4	9309 D 1	9324 E 1	9338 D 3	9356 E 2	
1304 D 6	2305 E 1	2320 B 2	2338 C 2	2365 A 1	2379 B 6	3313 E 3	3329 D 3	3349 A 9	3363 B 3	3378 B 5	3399 A 4	6331 E 2	6358 A 4	6375 B 3	7307 D 3	7368 B 5	9310 B 1	9325 C 3	9339 E 3	9357 D 2	
1345 A 9	2306 C 1	2322 D 3	2339 E 2	2366 A 1	2390 E 4	3315 E 2	3331 E 2	3350 A 9	3364 B 3	3379 B 5	5350 D 8	6332 C 2	6359 A 6	6384 B 4	7342 B 9	7369 B 5	9312 B 4	9326 B 1	9340 A 2	9358 E 2	
1346 B 9	2307 E 1	2323 D 1	2343 B 9	2367 A 3	2391 B 2	3316 C 2	3333 E 4	3351 A 9	3365 A 2	3380 E 4	6301 D 2	6335 D 1	6360 A 2	6386 B 3	7351 C 9	7374 E 4	9313 C 5	9327 D 3	9341 B 5	9360 A 6	
1350 E 9	2308 C 1	2324 B 1	2344 B 9	2368 A 3	3301 E 3	3317 E 1	3334 D 1	3352 C 1	3367 C 4	3382 B 5	6302 D 2	6340 A 9	6361 A 2	6391 E 5	7352 C 9	7376 B 2	9314 C 4	9328 D 2	9342 C 4	9361 A 4	
1352 E 9	2309 E 1	2327 E 6	2345 B 9	2369 B 4	3302 E 3	3318 C 1	3335 E 3	3353 E 1	3368 C 4	3383 B 5	6303 D 2	6341 A 9	6362 A 3	6392 E 5	7353 A 9	8304 E 6	9315 B 3	9329 D 3	9343 A 4	9362 B 4	
1355 E 7	2310 C 1	2328 E 6	2351 E 9	2370 D 4	3303 E 3	3319 E 2	3336 D 6	3354 B 9	3369 A 5	3384 C 4	6304 D 2	6342 A 9	6363 D 4	6393 E 5	7357 A 4	8305 D 3	9316 D 2	9330 D 3	9344 C 3	9363 A 3	
1356 A 8	2311 E 1	2329 D 1	2357 A 4	2371 C 5	3304 E 3	3320 C 2	3337 E 6	3355 D 1	3370 A 5	3385 B 4	6305 E 2	6343 A 9	6364 D 4	6394 B 3	7358 A 4	9301 E 5	9317 C 3	9331 D 4	9346 E 3	9364 B 4	

COMPONENT SIDE VIEW


1
2
3
4
5
6
7
8
9
A
B
C
D
E
IEC:T 5A UL/CSA:T 6.3A
UL/CSA:T 3.15A
IEC:T 2.5A
IE:T 1.6A
UL/CSA:T 2A
IEC:T 2A H
UL/CSA:T 3A
0014
6360
7360
9363
1360
9340
6361
1008
1302
1304
1301
1303
1355
1350
1352
5350
2351
7353
7352
7351
7342
2358
2361
2360
2359
2335
2336
2337
2327
9350
9351
3341
3343
3345
3339

POWER BOARD SUPPLY PART


ITEM 1356,1357,1358,1359
110-127 VAC
220-240 VAC
1350
T501
1352
230V
5350
2351
10n
1N4004
6351
6352
6353
6354
7352
BT151
7342
BC558
3354
100
7351
STP7NA40
3357
0,22
1W
3339
10M
3341
2M2
3345
47k
3346
470k
3343
470k
6341
1N4148
6342
1N4148
3349
150k
6343
6344
2345
10n
2344
0.22u
6340
3350
270k
2343
10u
6345
BZX79-C12
3351
470k
CQY80NG
7353
1008
110/127V
220/240V
1355 *
180-220V
30V
th.fuse
NTC
1356
1357
1358
1345
8301
0011
1346
0013
8302
22V
4V
9V
1V
D3SBA20
6360
18V
2362
100n
2363
100n
2364
2366
D5SBA20
6361
2365
100n
27V
2361
4700u
2359
4700u
2360
4700u
+24V
+16V
+12V
7360
BD438-RAIL
2375
2u2
12V
17.2V
3372
15k
3371
15k
3382
6k8
6384
BZX79-C12
3383
6k8
+5.6V
NTC
3380
680
3369
1K
3370
1K
2377
2u2
3360
220
3365
220
3361
47k
17.1V
7363
BC548
7376
BT151
0V
6386
BZX79-C36
6362
BZX79-B11
2368
100u
3362
47k
7364
BC548
0.6V
3374
330
2367
1u
2374
1n
3363
82k
3364
1k
3375
6k8
3379
220
2379
47u
3378
10k
4.2V
7369
BC558
2.4V
4.8V
3386
100
6397
1N4148
6396
1N4148
PWI
STBY
1.3V
2378
220u
+5.6V
6368
3373
4k7
6367
3387
4k7
6373
BZX79-F8V2
2373
47n
3388
4k7
BC558
7368
5.6V
5.8V
3385
1k8
3384
5k6
3398
18k
3368
18k
3367
22k
7366
BC558
4.8V
4.4V
2370
47u
2371
47u
6366
1N4148
6363
1N4148
Voltage Doubler
6365
1N4148
6364
1N4148
2372
47u
3377
4k7
3376
470
2376
4n7
6374
BZX79-C24
7374
BC558
-25V
-24V
-23V
+16V
7358
BD437
5.6V
2357
1u
6358
BZX79-B6V2
NTC
PWI
6391
BZX79-C4V7
-30V
4.5V AC
6392
1N4148
6393
1N4148
2390
47u
3391
220
3390
220
4.5V
0.3V
TO/FROM POWER BOARD AF PART
1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I

	1352	1356	1357	1358	1359	3339	1355	6351-6354
/02	T2AH	T5A	T2.5A	T5A	T1.6A	---	---	1N4004GP
/37	T3A	T6.3A	T3.15A	T6.3A	T2A	X	---	1N5393GP
/21	T2AH	T5A	T2.5A	T5A	T2A	---	X	1N5395GP

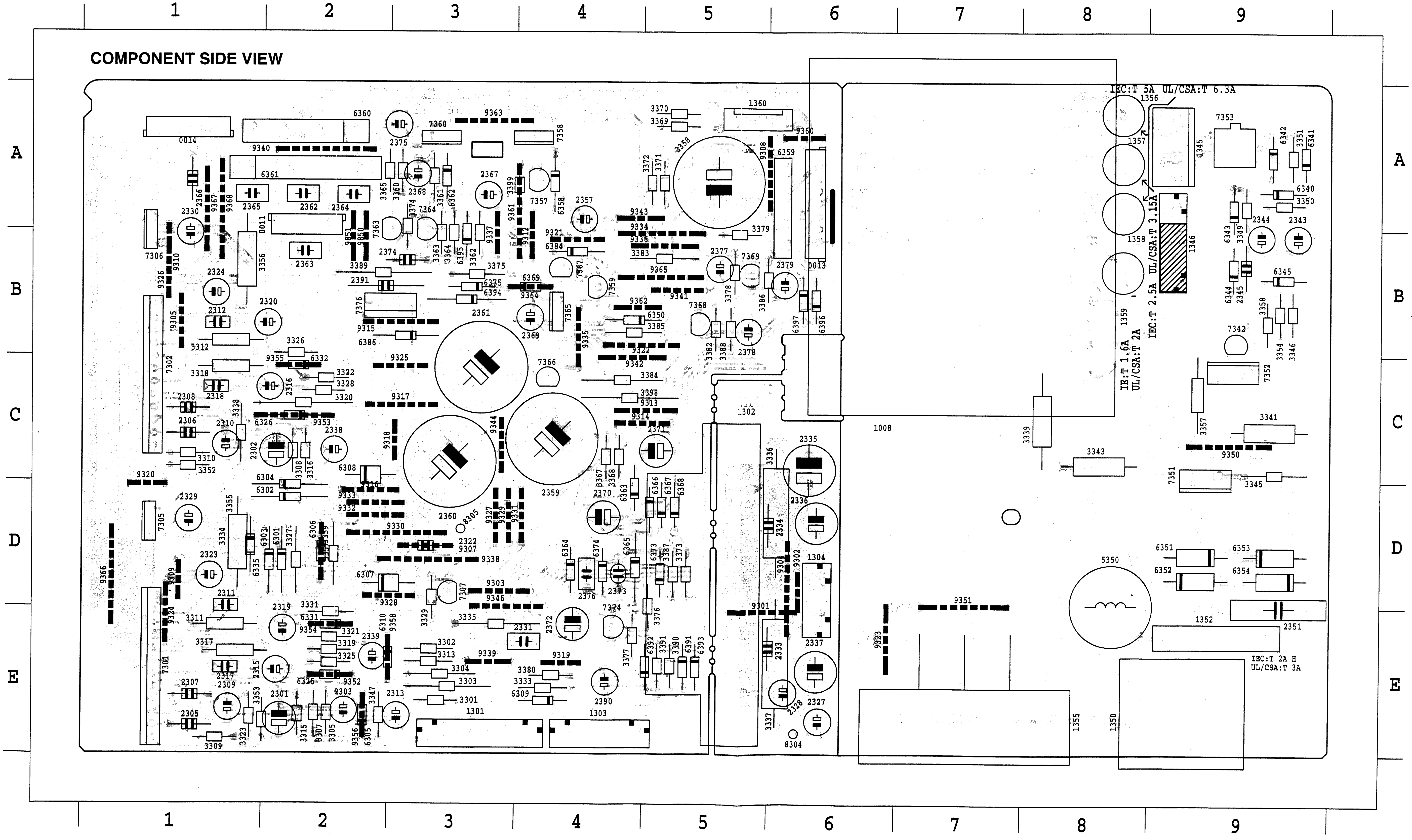
...V Voltages measured during operation

[...V] Voltages measured in ECO Mode (Stand by and display off)

0011	A 7
0013	B 7
1008	A 5
1345	A 6
1346	B 6
1350	B 1
1352	B 1
1355	B 4
1356	A 6
1357	B 6
1358	B 6
2343	F 4
2344	E 4
2345	D 5
2351	A 3
2357	G12
2359	B11
2360	B10
2361	B10
2362	A 8
2363	A 9
2364	B10
2365	A10
2366	A10
2367	D12
2368	C14
2370	F 7
2371	F 8
2372	G 8
2373	F 9
2374	D13
2375	B11
2376	H 8
2377	C10
2378	E10
2379	D11
2390	I11
3339	D 1
3341	D 2
3343	D 4
3345	D 2
3346	F 2
3349	D 4
3350	F 4
3351	F 5
3354	B 3
3357	C 3
3358	C 3
3360	C12
3361	C12
3362	C14
3363	D14
3364	D14
3365	C12
3367	F13
3368	E13
3369	C 9
3370	C 9
3371	C 9
3372	B 9
3373	E 8
3374	C13
3375	D11
3376	H 9
3377	G 8
3378	D 9
3379	D11
3380	C 8
3382	C10
3383	C11
3384	F 9
3385	E10
3386	D10
3387	E 8
3388	E 9
3390	I 8
3391	H 8
3398	F 9
5350	B 2
6340	F 3
6341	E 2
6342	D 3
6343	D 4
6344	D 4
6345	F 4
6351	B 2
6352	B 2
6353	B 3
6354	B 3
6358	G12
6360	A 9
6361	A10
6362	C14
6363	F 8
6364	G 8
6365	G 7
6366	F 8
6367	E 8
6368	E 8
6373	F 8
6374	H 8
6384	C11
6386	B14
6391	H11
6392	H11
6393	H11
6396	D 9
6397	D 8
7342	B 3
7351	C 2
7352	B 3
7353	F 5
7358	F12
7360	B12
7363	C12
7364	C13
7366	E14
7368	E 9
7369	D10
7374	H 9
7376	C13
9363	F11
9365	G12

0011 A 2	1357 A 8	2312 B 1	2330 B 1	2358 A 5	2372 E 4	3305 E 2	3321 E 2	3338 C 1	3356 B 1	3371 A 5	3386 B 5	6306 D 2	6344 B 9	6365 D 4	6395 B 3	7359 B 4	9302 D 6	9318 C 3	9332 D 2	9350 C 9	9365 B 5
0013 A 6	1358 A 8	2313 E 3	2331 E 4	2359 C 4	2373 D 4	3307 E 2	3322 C 2	3339 C 8	3357 C 9	3372 A 5	3387 D 5	6307 D 2	6345 B 9	6366 D 5	6396 B 6	7360 A 3	9303 D 3	9319 E 4	9333 D 2	9351 D 7	9366 D 1
0014 A 1	1359 B 8	2315 E 2	2333 E 5	2360 C 3	2374 B 3	3308 C 2	3323 E 1	3341 C 9	3358 B 9	3373 D 5	3388 B 5	6308 C 2	6350 B 4	6367 D 5	6397 B 6	7363 B 2	9304 D 6	9320 D 1	9334 B 5	9352 E 2	9367 A 1
1008 B 7	1360 A 5	2316 C 2	2334 D 5	2361 C 3	2375 A 3	3309 E 1	3325 E 2	3343 C 8	3359 D 2	3374 A 3	3389 B 2	6309 E 4	6351 D 9	6368 D 5	7301 E 1	7364 B 3	9305 B 1	9321 B 4	9335 B 4	9353 C 2	9368 A 1
1301 E 3	2301 E 2	2317 E 1	2335 C 6	2362 A 2	2376 D 4	3310 C 1	3326 B 2	3345 C 9	3360 A 3	3375 B 3	3390 E 5	6310 E 2	6352 D 9	6369 B 4	7302 C 1	7365 B 4	9307 D 3	9322 B 4	9336 B 5	9354 E 2	9850 B 2
1302 D 5	2302 C 2	2318 C 1	2336 D 6	2363 B 2	2377 B 5	3311 E 1	3327 D 2	3346 B 9	3361 A 3	3376 D 5	3391 E 5	6325 E 2	6353 D 9	6373 D 5	7305 D 1	7366 C 4	9308 A 5	9323 E 6	9337 B 3	9355 C 2	9851 B 2
1303 E 4	2303 E 2	2319 E 2	2337 E 6	2364 A 2	2378 B 5	3312 B 1	3328 C 2	3347 E 2	3362 B 3	3377 E 4	3398 C 4	6326 C 2	6354 D 9	6374 D 4	7306 B 1	7367 B 4	9309 D 1	9324 E 1	9338 D 3	9356 E 2	
1304 D 6	2305 E 1	2320 B 2	2338 C 2	2365 A 1	2379 B 6	3313 E 3	3329 D 3	3349 A 9	3363 B 3	3378 B 5	3399 A 4	6331 E 2	6358 A 4	6375 B 3	7307 D 3	7368 B 5	9310 B 1	9325 C 3	9339 E 3	9357 D 2	
1345 A 9	2306 C 1	2322 D 3	2339 E 2	2366 A 1	2390 E 4	3315 E 2	3331 E 2	3350 A 9	3364 B 3	3379 B 5	5350 D 8	6332 C 2	6359 A 6	6384 B 4	7342 B 9	7369 B 5	9312 B 4	9326 B 1	9340 A 2	9358 E 2	
1346 B 9	2307 E 1	2323 D 1	2343 B 9	2367 A 3	2391 B 2	3316 C 2	3333 E 4	3351 A 9	3365 A 2	3380 E 4	6301 D 2	6335 D 1	6360 A 2	6386 B 3	7351 C 9	7374 E 4	9313 C 5	9327 D 3	9341 B 5	9360 A 6	
1350 E 9	2308 C 1	2324 B 1	2344 B 9	2368 A 3	3301 E 3	3317 E 1	3334 D 1	3352 C 1	3367 C 4	3382 B 5	6302 D 2	6340 A 9	6361 A 2	6391 E 5	7352 C 9	7376 B 2	9314 C 4	9328 D 2	9342 C 4	9361 A 4	
1352 E 9	2309 E 1	2327 E 6	2345 B 9	2369 B 4	3302 E 3	3318 C 1	3335 E 3	3353 E 1	3368 C 4	3383 B 5	6303 D 2	6341 A 9	6362 A 3	6392 E 5	7353 A 9	8304 E 6	9315 B 3	9329 D 3	9343 A 4	9362 B 4	
1355 E 7	2310 C 1	2328 E 6	2351 E 9	2370 D 4	3303 E 3	3319 E 2	3336 D 6	3354 B 9	3369 A 5	3384 C 4	6304 D 2	6342 A 9	6363 D 4	6393 E 5	7357 A 4	8305 D 3	9316 D 2	9330 D 3	9344 C 3	9363 A 3	
1356 A 8	2311 E 1	2329 D 1	2357 A 4	2371 C 5	3304 E 3	3320 C 2	3337 E 6	3355 D 1	3370 A 5	3385 B 4	6305 E 2	6343 A 9	6364 D 4	6394 B 3	7358 A 4	9301 E 5	9317 C 3	9331 D 4	9346 E 3	9364 B 4	

COMPONENT SIDE VIEW



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A
B
C
D
E
IEC:T 5A UL/CSA:T 6.3A
UL/CSA:T 3.15A
UL/CSA:T 2.5A
IEC:T 2A
IE:T 1.6A
UL/CSA:T 2A
IEC:T 2A H
UL/CSA:T 3A
0014
6360
9363
7360
7358
1360
3370
3369
9360
6359
9308
2358
0013
1356
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7353
6342
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6340
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2343
6345
7342
7352
3341
3357
9350
3343
3339
1008
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7351
5350
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9323
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8304
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2359
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7301
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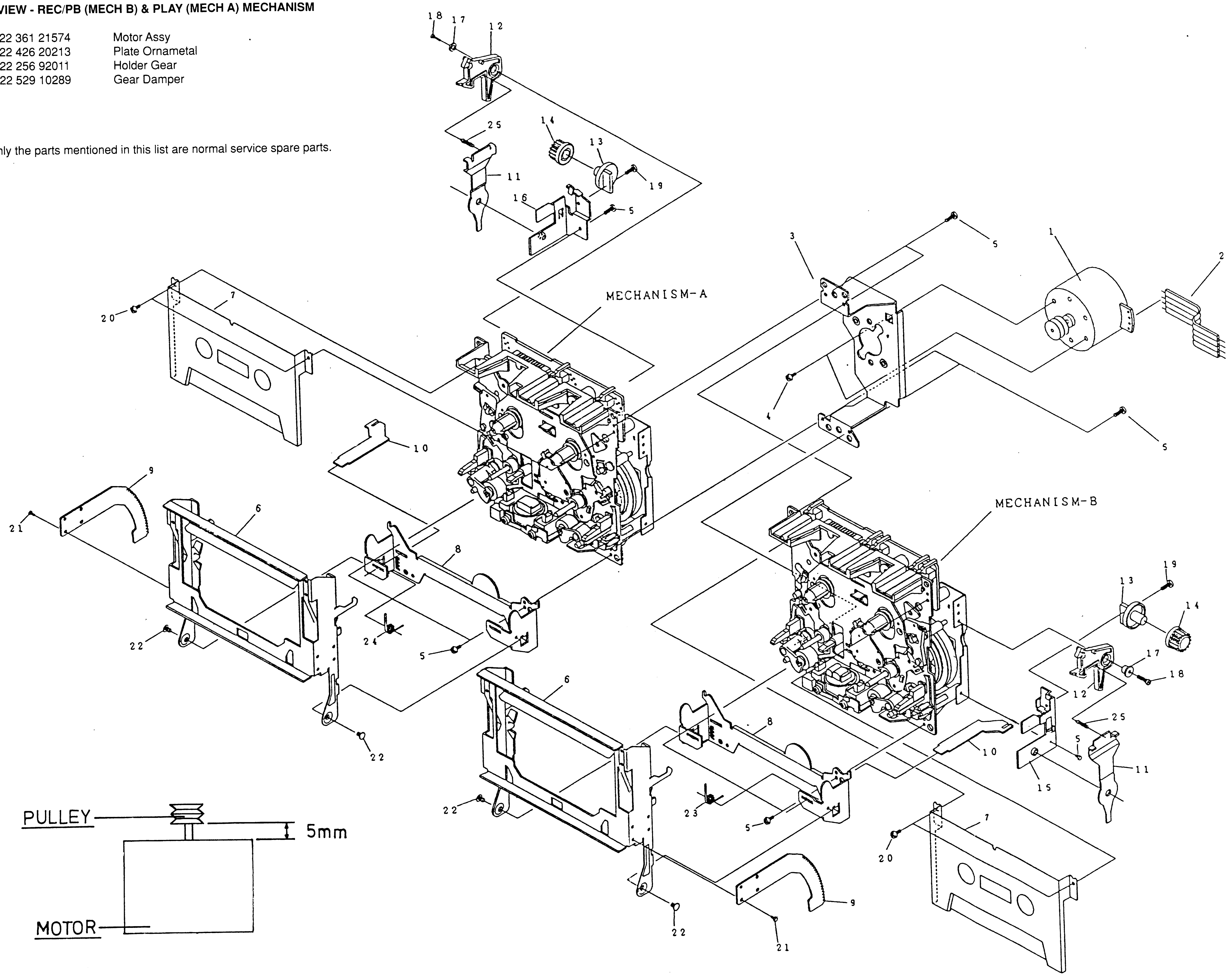
3323
3315
3307
3305
9356
6305
3347

CS 52243

EXPLODED VIEW - REC/PB (MECH B) & PLAY (MECH A) MECHANISM

1	4822 361 21574	Motor Assy
7	4822 426 20213	Plate Ornametal
13	4822 256 92011	Holder Gear
14	4822 529 10289	Gear Damper

Note: Only the parts mentioned in this list are normal service spare parts.


18
17
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MECHANISM-A
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8
MECHANISM-B
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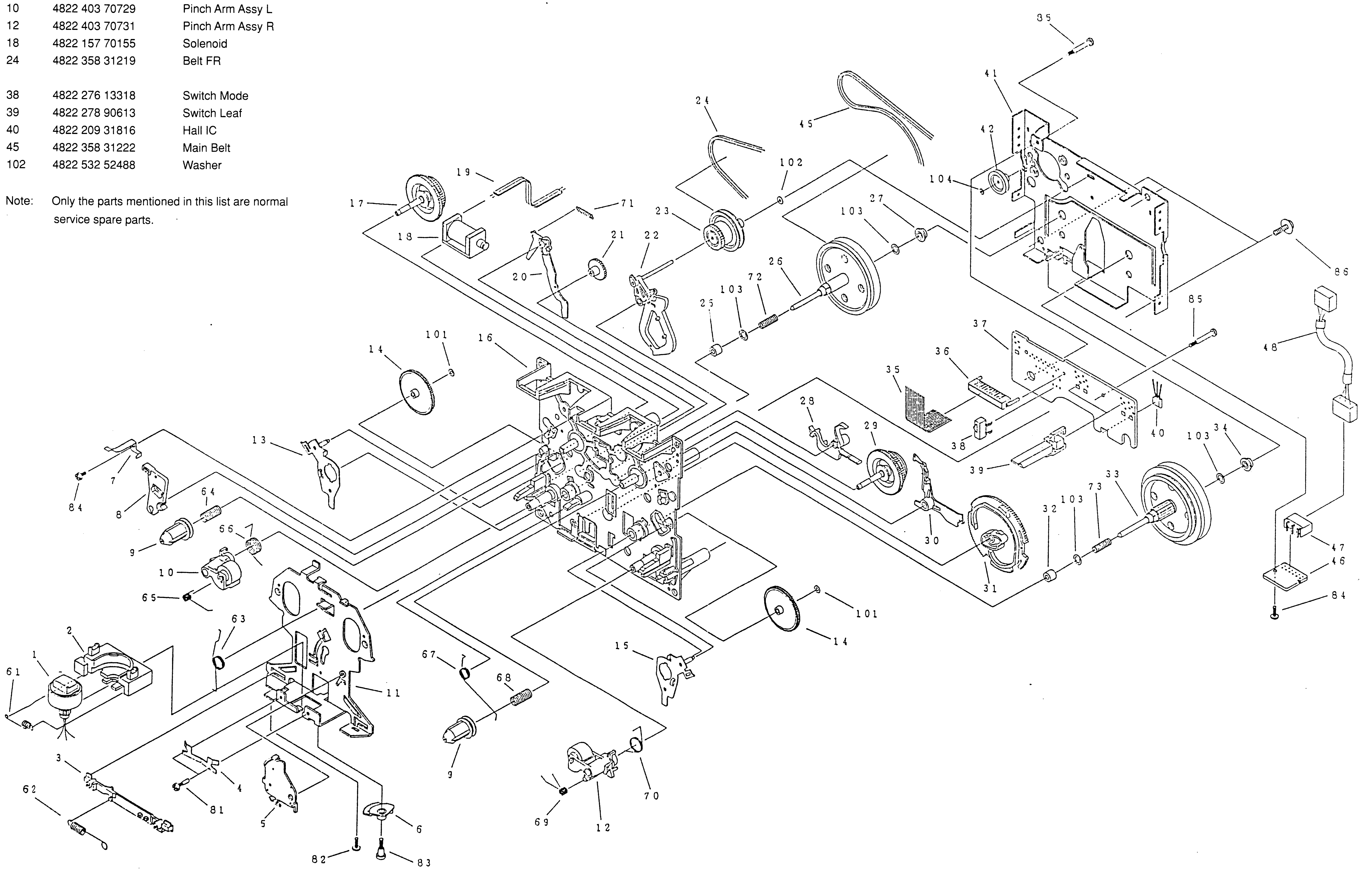
22
21
PULLEY
5mm
MOTOR

EXPLODED VIEW - PLAY (MECH A) MECHANISM

1	4822 249 30189	Play Head Assy
10	4822 403 70729	Pinch Arm Assy L
12	4822 403 70731	Pinch Arm Assy R
18	4822 157 70155	Solenoid
24	4822 358 31219	Belt FR
38	4822 276 13318	Switch Mode
39	4822 278 90613	Switch Leaf
40	4822 209 31816	Hall IC
45	4822 358 31222	Main Belt
102	4822 532 52488	Washer

Note: Only the parts mentioned in this list are normal service spare parts.


85
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102
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101
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101
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81
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83
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12
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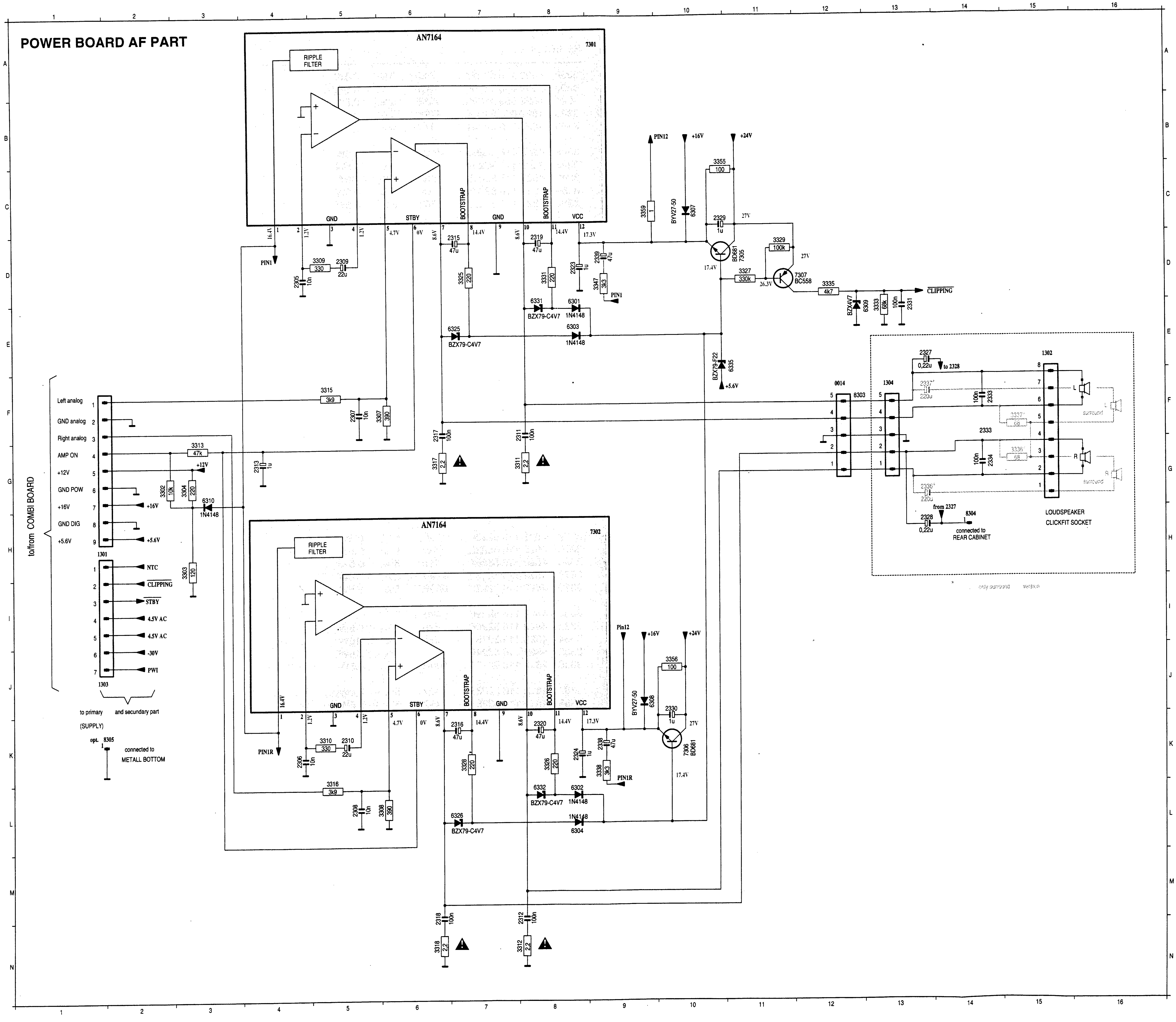
POWER BOARD AF PART


AN7164
7301
RIPPLE FILTER
GND
STBY
BOOTSTRAP
VCC
PIN1
PIN12
+16V
+24V
3355
100
3359
1
BYV27-50
6307
2329
1u
27V
3329
100k
BD681
7305
17.4V
3327
330k
26.3V
7307
BC558
3335
4k7
BZX4V7
6309
3333
68k
100n
2331
CLIPPING
16.4V
1.2V
4.7V
0V
8.6V
14.4V
17.3V
2315
47u
2319
47u
2339
47u
2323
1u
3347
3k3
3309
330
2309
22u
2305
10n
3325
220
3331
220
6331
BZX79-C4V7
6301
1N4148
6325
BZX79-C4V7
6303
1N4148
BZX79-F22
6335
+5.6V
3315
3k9
2307
10n
3307
390
2317
100n
2311
100n
3317
2.2
3311
2.2
Left analog
GND analog
Right analog
AMP ON
+12V
GND POW
+16V
GND DIG
+5.6V
1301
NTC
CLIPPING
STBY
4.5V AC
4.5V AC
-30V
PWI
1303
to/from COMBI BOARD
to primary
(SUPPLY)
and secundary part
opt. 8305
connected to
METALL BOTTOM
3313
47k
2313
1u
+12V
3302
10k
3304
220
6310
1N4148
3303
120
AN7164
7302
RIPPLE FILTER
PIN1R
Pin12
BYV27-50
6308
3356
100
2330
1u
7306
BD681
2316
47u
2320
47u
2338
47u
2324
1u
3338
3k3
3310
330
2310
22u
2306
10n
3328
220
3326
220
6332
BZX79-C4V7
6302
1N4148
6326
BZX79-C4V7
1N4148
6304
3316
3k9
2308
10n
3308
390
2318
100n
2312
100n
3318
2.2
3312
2.2
0014
8303
1304
2327
0,22u
to 2328
2337*
220u
100n
2333
3337*
68
2333
3336*
68
100n
2334
2336*
220u
from 2327
2328
0,22u
8304
connected to
REAR CABINET
1302
L
R
surround
surround
LOUDSPEAKER
CLICKFIT SOCKET
* only surround version

0014	F12
1301	H 1
1302	E15
1303	J 1
1304	F13
2303	D 4
2305	D 5
2306	K 5
2307	F 5
2308	L 5
2309	D 5
2310	K 5
2311	F 8
2312	M 8
2313	G 4
2315	D 7
2316	K 7
2317	F 6
2318	M 6
2319	D 8
2320	K 8
2323	D 8
2324	K 8
2327	E13
2328	H13
2329	C10
2330	J10
2331	E13
2333	E14
2334	G14
2335	H15
2336	G13
2337	F13
2338	K 9
2339	D 9
3301	D 4
3302	G 2
3303	H 3
3304	G 3
3305	E 4
3307	F 6
3308	L 6
3309	D 5
3310	K 5
3311	G 8
3312	N 8
3313	G 3
3315	F 5
3316	L 5
3317	G 6
3318	N 6
3323	E 5
3325	D 7
3326	K 8
3327	D11
3328	K 7
3329	D11
3331	D 8
3333	E13
3335	D12
3336	G15
3337	F15
3338	K 9
3347	D 9
3352	K 4
3355	B10
3356	J10
3359	C 9
6301	E 8
6302	L 8
6303	E 8
6304	L 8
6305	D 2
6306	K 4
6307	C10
6308	J 9
6309	E12
6325	E 7
6326	L 7
6331	D 8
6332	L 8
6335	E11
7301	A 9
7302	G 8
7305	D11
7306	K10
7307	D12
8304	H14
8305	K 1

MISCELLANEOUS

	4822 492 71734	SPRING CLIP TO126
	4822 255 40179	SPRING CLIP TO220
	4822 492 71733	SPRING CLIP AN71XX
	4822 492 71704	FIXATION RECTIFIER
1008	4822 146 21827	MAINS TRANSFORMER /21/41
1008	4822 146 21826	MAINS TRANSFORMER /22
1008	4822 146 31506	MAINS TRANSFORMER /37
1302	4822 267 31107	LS-TERMINAL for surround
1302	4822 267 31176	LS-TERMINAL no surround
1350	4822 265 31015	MAINS SOCKET not for /37
1350	4822 265 31016	MAINS SOCKET only for /37
1352	5322 253 30373	FUSE 2A
1352	4822 070 33152	FUSE 3,15A
1355	4822 272 10269	VOLTAGE SELECTOR
1356	4822 071 55002	FUSE T5A
1356	4822 252 51123	FUSE T6,3A
1357	4822 071 52502	FUSE T 2,5A
1357	4822 252 51121	FUSE 3,15A
1358	4822 071 55002	FUSE T5A
1358	4822 252 51123	FUSE T6,3A

DIODES

6301	4822 130 30621	1N4148
6302	4822 130 30621	1N4148
6303	4822 130 30621	1N4148
6304	4822 130 30621	1N4148
6307	4822 130 31982	BYV27-100
6308	4822 130 31982	BYV27-100
6309	4822 130 34174	BZX79-B4V7
6310	4822 130 30621	1N4148
6325	4822 130 34174	BZX79-B4V7
6326	4822 130 34174	BZX79-B4V7
6331	4822 130 34174	BZX79-B4V7
6332	4822 130 34174	BZX79-B4V7
6335	4822 130 34441	BZX79-F22
6340	4822 130 30621	1N4148
6341	4822 130 30621	1N4148
6342	4822 130 30621	1N4148
6343	4822 130 30621	1N4148
6344	4822 130 30621	1N4148
6345	4822 130 34197	BZX79-C12
6351	4822 130 83362	1N4004GP not for /21/37
6351	4822 130 83928	1N5395GP only for /21
6351	4822 130 83929	1N5393GP only for /37
6352	4822 130 83362	1N4004GP not for /21/37
6352	4822 130 83928	1N5395GP only for /21
6352	4822 130 83929	1N5393GP only for /37
6353	4822 130 83362	1N4004GP not for /21/37
6353	4822 130 83928	1N5395GP only for /21
6353	4822 130 83929	1N5393GP only for /37
6354	4822 130 83362	1N4004GP not for /21/37
6354	4822 130 83928	1N5395GP only for /21
6354	4822 130 83929	1N5393GP only for /37
6358	4822 130 34167	BZX79-C6V2
6360	4822 130 82079	D3SBA20
6361	4822 130 82078	D5SBA20
6362	4822 130 34488	BZX79-C11
6363	4822 130 30621	1N4148
6364	4822 130 30621	1N4148
6365	4822 130 30621	1N4148
6366	4822 130 30621	1N4148
6367	4822 130 30621	1N4148

DIODES

6368	4822 130 30621	1N4148
6373	4822 130 34382	BZX79-C8V2
6374	4822 130 34398	BZX79-C24
6384	4822 130 34197	BZX79-C12
6386	4822 130 34368	BZX79-C36
6391	4822 130 34174	BZX79-B4V7
6392	4822 130 30621	1N4148
6393	4822 130 30621	1N4148
6396	4822 130 30621	1N4148
6397	4822 130 30621	1N4148

TRANSISTORS

7305	5322 130 44786	BD681
7306	5322 130 44786	BD681
7307	5322 130 60068	BC558C
7342	5322 130 60068	BC558C
7351	4822 130 63925	STP7NA40
7352	5322 130 24081	BT151-500R
7358	4822 130 40982	BD437
7360	4822 130 40995	BD438
7363	4822 130 44196	BC548C
7364	4822 130 44196	BC548C
7366	5322 130 60068	BC558C
7368	5322 130 60068	BC558C
7369	5322 130 60068	BC558C
7374	5322 130 60068	BC558C
7376	5322 130 24081	BT151-500R

INTEGRATED CIRCUITS

7301	4822 209 90411	AN7164
7302	4822 209 90411	AN7164
7353	4822 130 91451	CQY80NG

COILS

5350	4822 157 71285	MAINS FILTER

RESISTORS

3302	4822 116 83864	10k	5%	0,5W
3303	4822 116 52206	120R	5%	0,5W
3304	4822 116 52215	220R	5%	0,16W
3307	4822 116 52222	390R	5%	0,16W
3308	4822 116 52222	390R	5%	0,16W
3309	4822 116 52219	330R	5%	0,5W
3310	4822 116 52219	330R	5%	0,5W
3311	4822 052 10228	2R2	5%	0,33W
3312	4822 052 10228	2R2	5%	0,33W
3313	4822 116 52284	47k	5%	0,5W
3315	4822 116 52276	3k9	5%	0,5W
3316	4822 116 52276	3k9	5%	0,5W
3317	4822 052 10228	2R2	5%	0,33W
3318	4822 052 10228	2R2	5%	0,33W
3325	4822 116 52215	220R	5%	0,16W
3326	4822 116 52215	220R	5%	0,16W
3327	4822 116 52272	330k	5%	0,5W
3328	4822 116 52215	220R	5%	0,16W
3329	4822 116 52234	100k	5%	0,5W
3331	4822 116 52215	220R	5%	0,16W
3333	4822 116 52297	68k	5%	0,5W
3334	4822 116 83874	220k	5%	0,5W
3335	4822 116 52283	4k7	5%	0,5W
3336	4822 117 11782	68R	5%	
3337	4822 117 11782	68R	5%	

RESISTORS

3338	4822 116 52269	3k3	5%	0,5W
3339	4822 053 21106	10M	5%	0,5W
3341	4822 053 21225	2M2	5%	0,5W
3343	4822 053 21474	470k	5%	0,5W
3345	4822 116 52284	47k	5%	0,5W
3346	4822 116 52285	470k	5%	0,5W
3347	4822 116 52269	3k3	5%	0,5W
3349	4822 116 52245	150k	5%	0,16W
3350	4822 116 83878	270k	5%	0,5W
3351	4822 116 52285	470k	5%	0,5W
3354	4822 116 52175	100R	5%	0,5W
3355	4822 053 11101	100R	5%	2W
3356	4822 053 11101	100R	5%	2W
3357	4822 117 11744	0R22	5%	1W
3359	4822 116 80176	1R	5%	0,5W
3360	4822 116 52215	220R	5%	0,16W
3361	4822 116 52284	47k	5%	0,5W
3362	4822 116 52284	47k	5%	0,5W
3363	4822 116 52304	82k	5%	0,5W
3364	4822 050 11002	1k	5%	0,2W
3365	4822 116 52215	220R	5%	0,16W
3367	4822 116 52257	22k	5%	0,5W
3368	4822 116 52251	18k	5%	0,5W
3369	4822 050 11002	1k	5%	0,2W
3370	4822 050 11002	1k	5%	0,2W
3371	4822 116 52244	15k	5%	0,5W
3372	4822 116 52244	15k	5%	0,5W
3373	4822 116 52283	4k7	5%	0,5W
3374	4822 116 52219	330R	5%	0,5W
3375	4822 116 52296	6k8	5%	0,5W
3376	4822 116 52224	470R	5%	0,5W
3377	4822 116 52283	4k7	5%	0,5W
3378	4822 116 83864	10k	5%	0,5W
3379	4822 116 52215	220R	5%	0,16W
3380	4822 116 52228	680R	5%	0,5W
3382	4822 116 52296	6k8	5%	0,5W
3383	4822 116 52296	6k8	5%	0,5W
3384	4822 116 52289	5k6	5%	0,16W
3385	4822 116 52249	1k8	5%	0,16W
3386	4822 116 52175	100R	5%	0,5W
3387	4822 116 52283	4k7	5%	0,5W
3388	4822 116 52283	4k7	5%	0,5W
3390	4822 116 52215	220R	5%	0,16W
3391	4822 116 52215	220R	5%	0,16W
3398	4822 116 52251	18k	5%	0,5W

CAPACITORS

2305	4822 121 51387	10nF	20%	16V
2306	4822 121 51387	10nF	20%	16V
2307	4822 121 51387	10nF	20%	16V
2308	4822 121 51387	10nF	20%	16V
2309	4822 124 41596	22µF	20%	50V
2310	4822 124 41596	22µF	20%	50V
2311	5322 121 42386	100nF	5%	63V
2312	5322 121 42386	100nF	5%	63V
2313	4822 124 40242	1µF	20%	63V
2315	4822 124 40433	47µF	20%	25V
2316	4822 124 40433	47µF	20%	25V
2317	5322 121 42386	100nF	5%	63V
2318	5322 121 42386	100nF	5%	63V
2319	4822 124 40433	47µF	20%	25V
2320	4822 124 40433	47µF	20%	25V

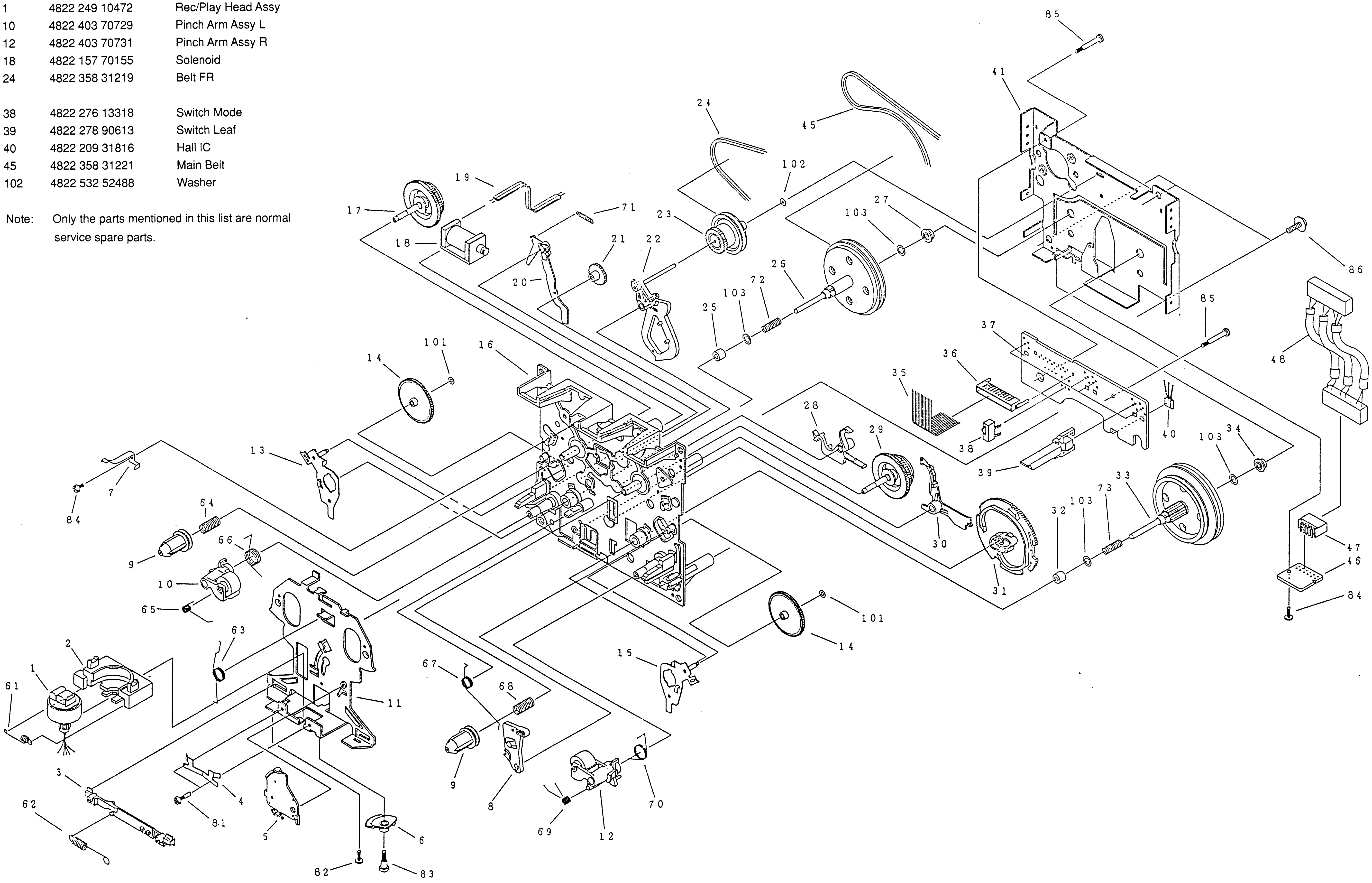
CAPACITORS

2323	4822 124 40242	1µF	20%	63V
2324	4822 124 40242	1µF	20%	63V
2327	4822 124 40746	0,22µF	20%	63V
2328	4822 124 40746	0,22µF	20%	63V
2329	4822 124 40242	1µF	20%	63V
2330	4822 124 40242	1µF	20%	63V
2330	4822 124 40242	1µF	20%	63V
2331	5322 121 42386	100nF	5%	63V
2333	4822 126 12882	100nF	20%	50V
2334	4822 126 12882	100nF	20%	50V
2336	4822 124 41992	220µF		35V
2337	4822 124 41992	220µF		35V
2338	4822 124 40433	47µF	20%	25V
2339	4822 124 40433	47µF	20%	25V
2343	4822 124 41579	10µF	20%	50V
2344	4822 124 40746	0,22µF	20%	63V
2345	4822 121 51387	10nF	20%	16V
2351	4822 126 13637	10nF	10%	1000V
2357	4822 124 40242	1µF	20%	63V
2359	4822 124 80563	4700µF	20%	35V
2360	4822 124 42119	4700µF	20%	25V
2361	4822 124 80563	4700µF	20%	35V
2362	5322 121 42386	100nF	5%	63V
2363	5322 121 42386	100nF	5%	63V
2364	5322 121 42386	100nF	5%	63V
2365	5322 121 42386	100nF	5%	63V
2366	4822 121 51387	10nF	20%	16V
2367	4822 124 40242	1µF	20%	63V
2368	4822 124 41525	100µF	20%	25V
2370	4822 124 80196	47µF	20%	50V
2371	4822 124 80196	47µF	20%	50V
2372	4822 124 80196	47µF	20%	50V
2373	4822 121 43526	47nF	5%	100V
2374	4822 122 33197	1nF	10%	50V
2375	4822 124 41576	2,2µF	20%	50V
2376	4822 121 43856	4,7nF	5%	250V
2377	4822 124 41576	2,2µF	20%	50V
2378	4822 124 40196	220µF	20%	16V
2379	4822 124 40433	47µF	20%	25V
2390	4822 124 40433	47µF	20%	25V

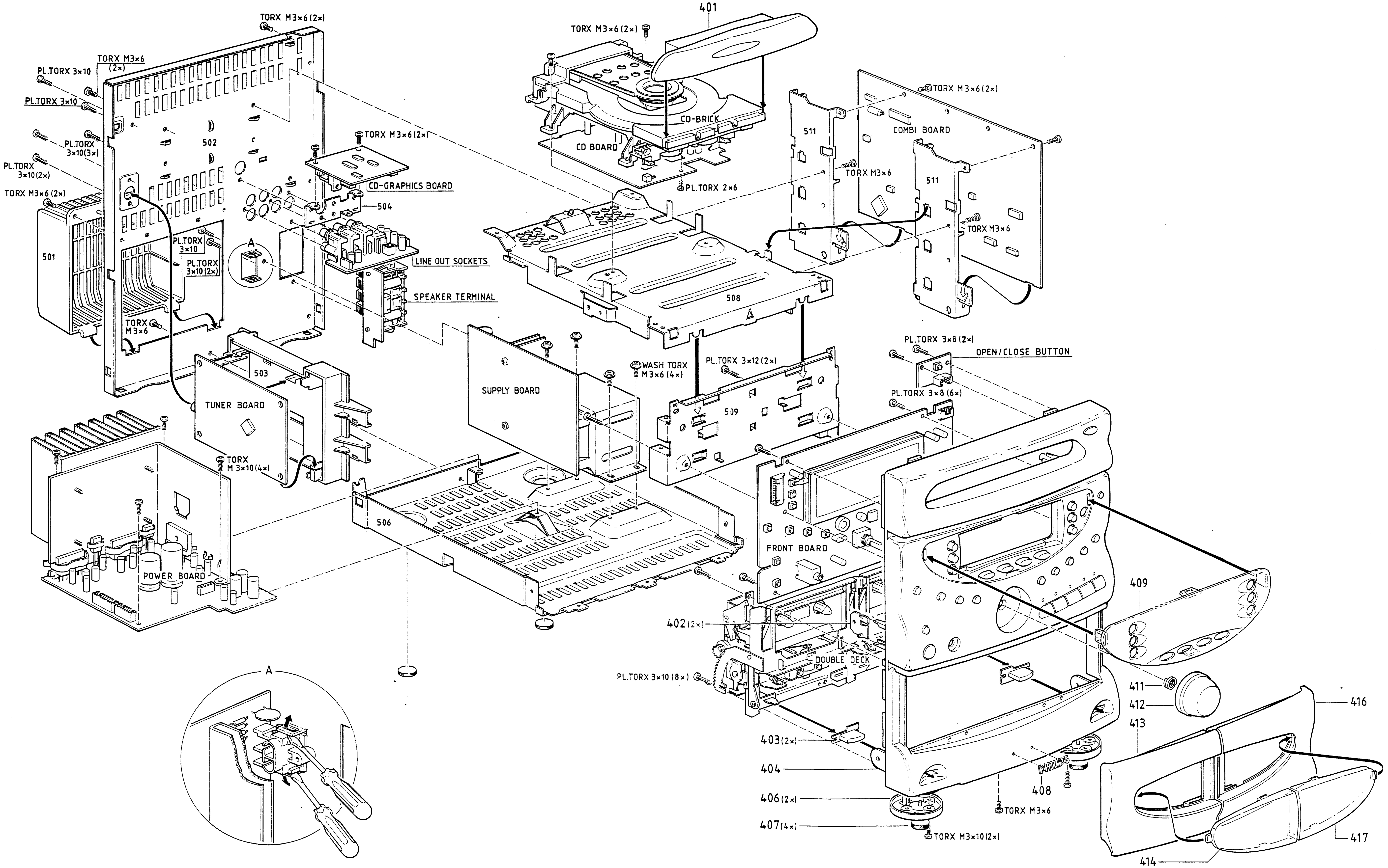
EXPLODED VIEW - REC/PB (MECH B) MECHANISM

1	4822 249 10472	Rec/Play Head Assy
10	4822 403 70729	Pinch Arm Assy L
12	4822 403 70731	Pinch Arm Assy R
18	4822 157 70155	Solenoid
24	4822 358 31219	Belt FR
38	4822 276 13318	Switch Mode
39	4822 278 90613	Switch Leaf
40	4822 209 31816	Hall IC
45	4822 358 31221	Main Belt
102	4822 532 52488	Washer

Note: Only the parts mentioned in this list are normal service spare parts.


85
41
24
45
102
19
71
17
18
23
27
103
86
21
22
20
26
72
103
25
85
37
48
36
35
101
14
16
28
29
40
38
103
34
39
13
7
84
64
66
9
33
73
103
32
30
10
65
31
47
46
84
101
14
63
15
2
1
61
67
68
11
9
8
70
3
62
4
81
5
6
69
12
82
83

EXPLODED VIEW OF SET I


TORX M3×6 (2×)
PL.TORX 3×10
TORX M3×6 (2×)
PL.TORX 3×10
PL.TORX 3×10(3×)
PL.TORX 3×10(2×)
TORX M3×6 (2×)
502
501
TORX M3×6(2×)
CD-GRAPHICS BOARD
504
A
PL.TORX 3×10
PL.TORX 3×10(2×)
LINE OUT SOCKETS
SPEAKER TERMINAL
TORX M3×6
503
TUNER BOARD
TORX M 3×10(4×)
POWER BOARD
401
TORX M3×6 (2×)
CD-BRICK
CD BOARD
PL.TORX 2×6
508
511
TORX M3×6 (2×)
COMBI BOARD
TORX M3×6
511
TORX M3×6
SUPPLY BOARD
WASH TORX M3×6 (4×)
PL.TORX 3×12 (2×)
509
506
PL.TORX 3×8 (2×)
OPEN/CLOSE BUTTON
PL.TORX 3×8 (6×)
FRONT BOARD
409
402 (2×)
DOUBLE DECK
PL.TORX 3×10 (8×)
411
412
413
416
403 (2×)
404
406 (2×)
407 (4×)
408
PHILIPS
TORX M3×6
TORX M3×10 (2×)
417
414
A

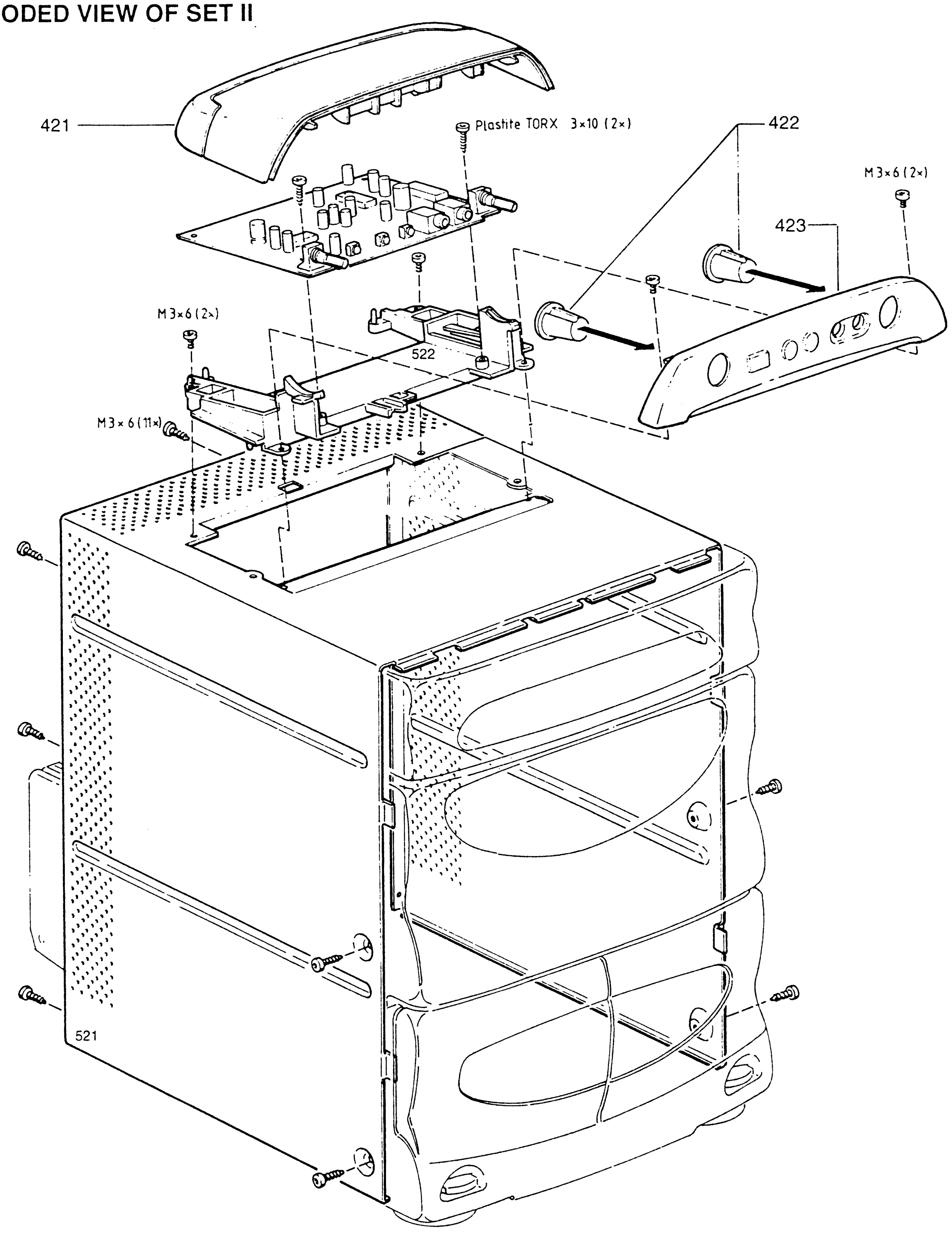
MECHANICAL PARTS

401	4822 444 40844	FRONT CD-TRAY
403	4822 410 63807	EJECT BUTTON
404	4822 425 20209	FRONT PRINTED for sets without RDS
404	4822 425 20212	FRONT PRINTED for sets with RDS only
406	4822 462 42211	FOOT ORNAMENTAL PART
407	4822 462 40683	FOOT RUBBER
408	4822 459 11086	WORDMARK PHILIPS
409	4822 450 62477	WINDOW DISPLAY
411	4822 492 51374	SPRING KNOB CLAMP
412	4822 413 51508	KNOB VOLUME
413	4822 443 64506	CASSETTE DOOR LEFT
414	4822 450 62478	CASSETTE WINDOW LEFT
416	4822 443 64507	CASSETTE DOOR RIGHT
417	4822 450 62479	CASSETTE WINDOW RIGHT
421	4822 444 40836	COVER KARAOKE
422	4822 413 41916	KNOB KARAOKE
	4822 492 51374	SPRING KNOB CLAMP
501	4822 444 40835	COVER HEATSINK
423	4822 426 51832	FRONT KARAOKE

MISCELLANEOUS

5001	4822 157 40202	TOROID RING 23x14x7
8030	4822 321 63183	CABLE WITH CAPACITOR
	4822 445 10443	LOUDSPEAKER BOX
	4822 218 21342	IRT RC8601/01
	4822 303 50063	FM AERIAL
	4822 303 50082	AM FRAME AERIAL
	4822 321 10249	MAINS CORD EUROPE

EXPLODED VIEW OF SET II


421
Plastite TORX 3×10 (2×)
422
M3×6 (2×)
423
M3×6 (2×)
522
M3×6 (11×)
521

MECHANICAL PARTS

421	4822 444 40836	COVER KARAOKE
422	4822 413 41916	KNOB KARAOKE
	4822 492 51374	SPRING KNOB CLAMP
501	4822 444 40835	COVER HEATSINK
423	4822 426 51832	FRONT KARAOKE

MISCELLANEOUS

5001	4822 157 40202	TOROID RING 23x14x7
8030	4822 321 63183	CABLE WITH CAPACITOR
	4822 445 10443	LOUDSPEAKER BOX
	4822 218 21342	IRT RC8601/01
	4822 303 50063	FM AERIAL
	4822 303 50082	AM FRAME AERIAL
	4822 321 10249	MAINS CORD EUROPE

4864

FW630

A96-352

Service
Service
Service

Product Service Group CE Audio

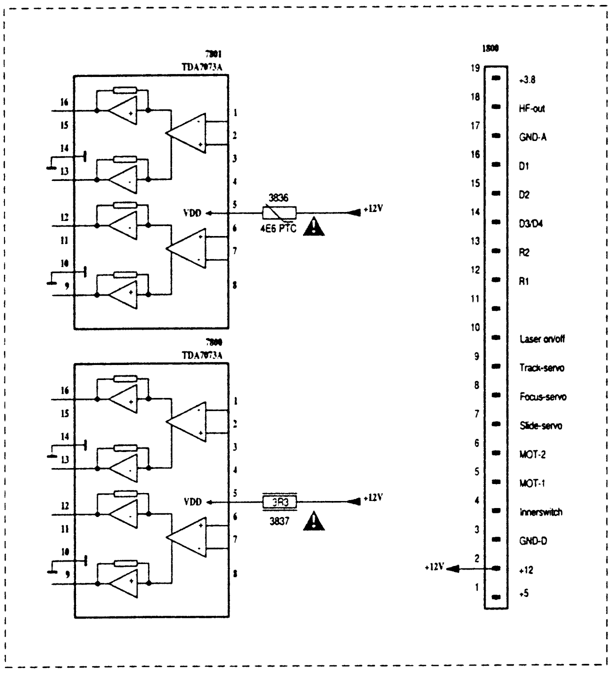
Service Information

Already published Service Informations: none

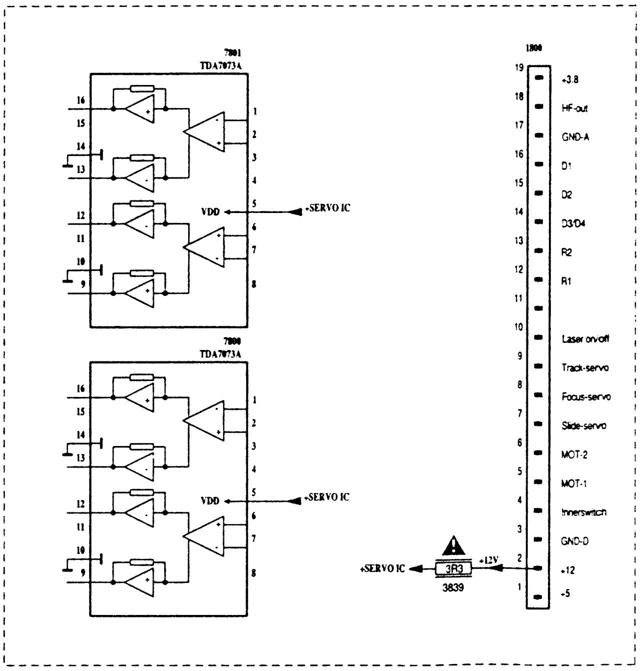
CD INTERFACE BOARD

* The supply for IC 7800 and 7801 have been changed.

old circuit


7801
TDA7073A
VDD
3836
4E6 PTC
+12V
7800
TDA7073A
3R3
3837
+12V
1800
+3.8
HF-out
GND-A
D1
D2
D3/D4
R2
R1
Laser on/off
Track-servo
Focus-servo
Slide-servo
MOT-2
MOT-1
Innerswitch
GND-D
+12
+5
+12V

new circuit


7801
TDA7073A
VDD
+SERVO IC
7800
TDA7073A
VDD
+SERVO IC
1800
+3.8
HF-out
GND-A
D1
D2
D3/D4
R2
R1
Laser on/off
Track-servo
Focus-servo
Slide-servo
MOT-2
MOT-1
Innerswitch
GND-D
+12
+5
+SERVO IC
3R3
3839
+12V

* To improve the performance of the HF Preamplifier following components have been changed:

2814 has been changed to	100pF	4822 122 10319.
2815 has been changed to	47pF	4822 122 33848.
2816 has been changed to	47pF	4822 122 33848.
2817 has been changed to	18pF	4822 126 12573.
3809 has been changed to	330k	4822 116 52272.

1996-05-20

(GB) 4822 725 24977

CS 52 704

Control Board

- To solve tuner search problems following components have been changed:

  2450 to 180pF 4822 126 10326
  2451 to 180pF 4822 126 10326
  3468 to 1kΩ 4822 051 10102

- In course of production the colour of the headphone socket has been changed to silver.

  The sockets are available with 4822 267 31919 gold
  4822 267 31506 silver

- To improve the ESD behaviour some components have been changed/added.

  2424 and 2425 have become a chip capacitor 10nF 4822 122 33177.
  4436 and 4437 have become a chip resistor 10kΩ 4822 051 20103.
  4470, 4471 and 4472 have been changed to 22kΩ 4822 051 20223.
  5414, 5415, 5416 and 5417 have been added. 4822 157 53139 fixed coil 4,7μH.
  IR - eye 7428 has been changed to GP1U28XP 4822 130 10165.
  5405 has been changed to 4,7μH. 4822 157 53139.
  This changes have been implemented from Layout .4 onwards.

Changes from Layout .2 (which is published in the Service Manual) to .3 and Layout .4 to .5 (which is annexed in this Service Information) are for Service not relevant.

Please add Chapter 6A (Control Board Layout .5) to your Manual.

Combi Board

- To improve the Signal to Noise Ratio in Dolby mode following components have been changed.

  2643 and 2644 have been changed to 15nF 4822 122 33128.
  2715 and 2716 have been changed to 100μF 4822 124 41584.
  3631 and 3632 have been changed to 47kΩ 4822 116 52284.
  3661 and 3662 have been changed to 330kΩ 4822 051 20334.
  3709 and 3710 have been changed to 22Ω 4822 116 20229.
  3733 and 3734 have been changed to 330Ω 4822 116 52219.
  3735 and 3736 have been changed to 18kΩ 4822 116 52251.
  3737 and 3738 have been changed to 3,3kΩ 4822 051 20332.

- Correction of partslist: 3509 and 3510 are 10Ω chip resistors 4822 051 20109.

- Due to standardisation following components have been changed.

  2539 has been changed to 33nF 4822 122 33342.
  2565 has been changed to 33nF 4822 126 13174.
  2566 has been changed to 33nF 4822 126 13174.
  2735 has been changed to 33nF 4822 126 13174.
  2760 has been changed to 33nF 4822 122 33342.
  2856 has been changed to 0,22μF 4822 124 40746.
  3531 has been changed to 3,3kΩ 4822 116 52269.
  3532 has been changed to 3,3kΩ 4822 051 20332.
  3569 has been changed to 82kΩ 4822 116 52304.
  3570 has been changed to 82kΩ 4822 116 52304.

  This changes are implemented from productionweek 9546 onwards.

ECO5 TUNER - BOARD

* **To avoid audible plops in FM mode with low input level**

2107	changed to	1µF	20%	50V	4822 121 51319
2152	changed to	33nF	10%	63V	4822 122 33342 ©
2153	changed to	15pF	5%	50V	5322 122 32481 ©
3101	changed to	47kΩ	5%	0,1W	4822 051 20473 ©
5130	rotated 180°				

* **Ceramic discriminator changed to definitive type.**

5120	changed to	CDA10,7MG61KA			4822 242 10251
3140	changed to	150Ω	5%	0,1W	4822 117 10353 ©

* **In course of production layout stage .6 has been implemented.**
(The layout stage can be identified by the last digit of the 12-figure number, printed in the copper pattern)

reason: Adaptions for AM-stereo versions.

For the new assembly drawing see attached sheet 7B-2-1.

Please add attached page 7B-2-1 (ECO5 TUNER BOARD Layout stage .8 with difference to .6 indicated) to your existing Manual.

* **To reduce sensitivity to ESD via antenna connector 1103 for AM frame aerial.**

3120	added	chip jumper 0805	4822 051 20008 ©
6106	added	1N4148	4822 130 30621

* **To improve FM sensitivity via 300Ω antenna.**

2101	changed to	47pF	5%	63V	5322 122 32452 ©

* **To improve accuracy of tuning in AM-search mode**

5114	changed to	AM-IF filter 450kHz	4822 157 70302

reason: original AM-AFC coil is sensitive to mechanical vibrations.

* **In course of production layout stage .7 has been implemented.**

reason: 2 jumpers added for RDS-versions.

For the new assembly drawing see attached sheet 7B-2-1.

Note: The Assembly Drawing published in this Service Information shows layout stage .8.
Difference to stage .7 is only a formal update of the code number in the copper pattern.

Combi Board

- To reduce the plop while turning volume from 1 to 0 following components have been changed:

4693 has been changed to 120kΩ	4822 116 52239.
2550 as been changed to 4,7µF	4822 124 40246.

- Due to standardisation following components have been changed.

2533 has been changed to 10pF	5322 122 32448.
2534 has been changed to 10pF	5322 122 32448.
3511 has been changed to 33kΩ	4822 116 52279.
3512 has been changed to 33kΩ	4822 051 20333.
3513 has been changed to 150kΩ	4822 051 20154.
3514 has been changed to 150kΩ	4822 051 20154.
3547 has been changed to 270kΩ	4822 051 20274.
3548 has been changed to 270kΩ	4822 051 20274.
3575 has been changed to 100kΩ	4822 116 52234.
3576 has been changed to 100kΩ	4822 051 20104.

This changes are implemented from productionweek 9549 onwards.

- The Incredible Stereo Feature has been redesignd. Transistors are used now instead of opamps. This change has been implemented from Layout stage .5 onwards.

Please replace existing page 9-1 by adapted page 9-1a. Add additional pages 9-17 up to 9-28 (Combi Board Layout .5) to your existing Manual.

Tuner Board

- A new Tunerboard has been introduced. It is planned to use the new tuner for /22 versions.

Please add additional Chapter 7D (Tuner 95) to your existing Manual.

Power Board

- To improve the temperature situation in the set resistors 3360 and 3365 have been changed to 470Ω Servicecode 4822 116 52224.

  This changes are implemented from productionweek 9540 onwards.

- Due to costreduction the bridge rectifier 6360 has been changed to two single diodes 1N5395GP.
  Servicecode 4822 130 83928.
  The two 4700µF elcaps (2361, 2359) have been changed into one 6800µF elcap.
  Servicecode 4822 124 11516.

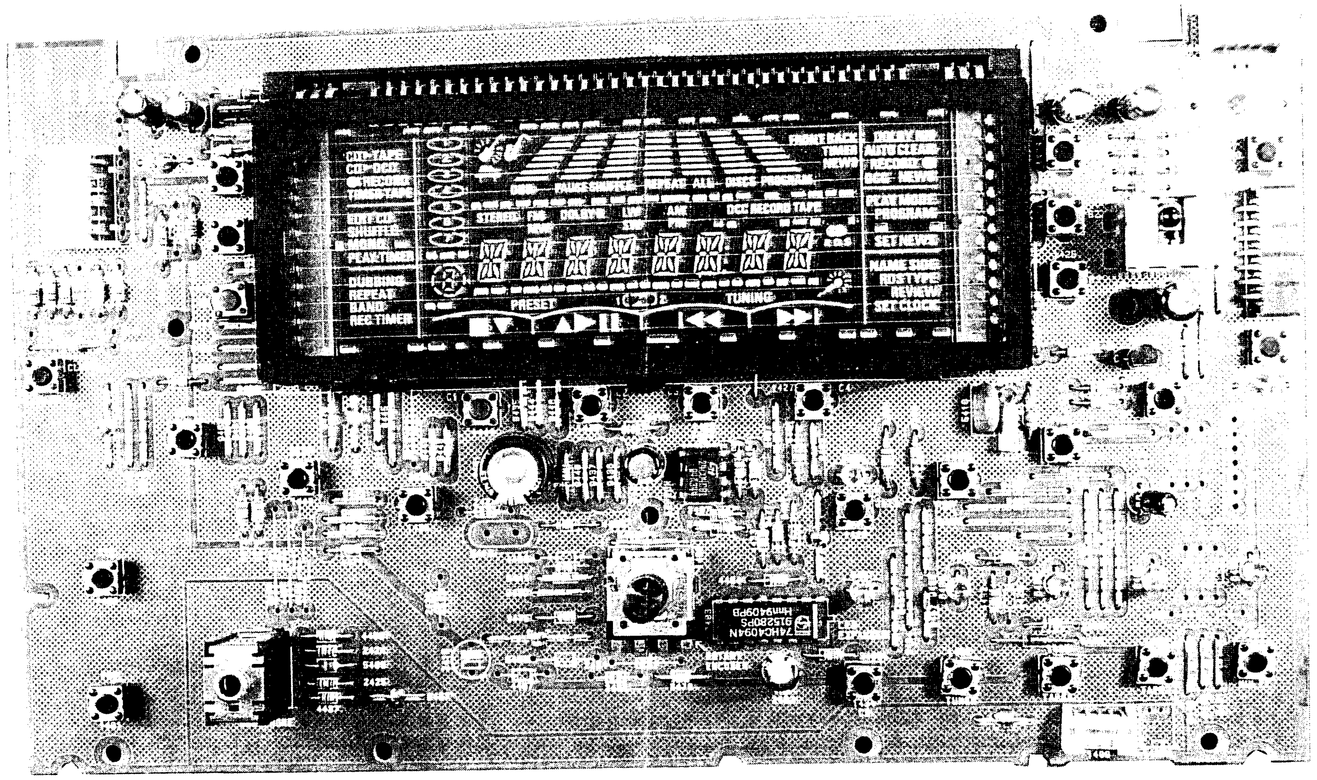
  This changes are implemented from Layout stage .6 onwards.

- To solve the 'FET blown' problem a SOAR (Save Operating ARea) protection has been designed.

  This changes are implemented from Layout stage .8 onwards.

Please add additional Chapter 11A (Power Board Layout stage .8) to your existing Manual.

Changes between Layout stage .6 and .7 are for Service meaningless.



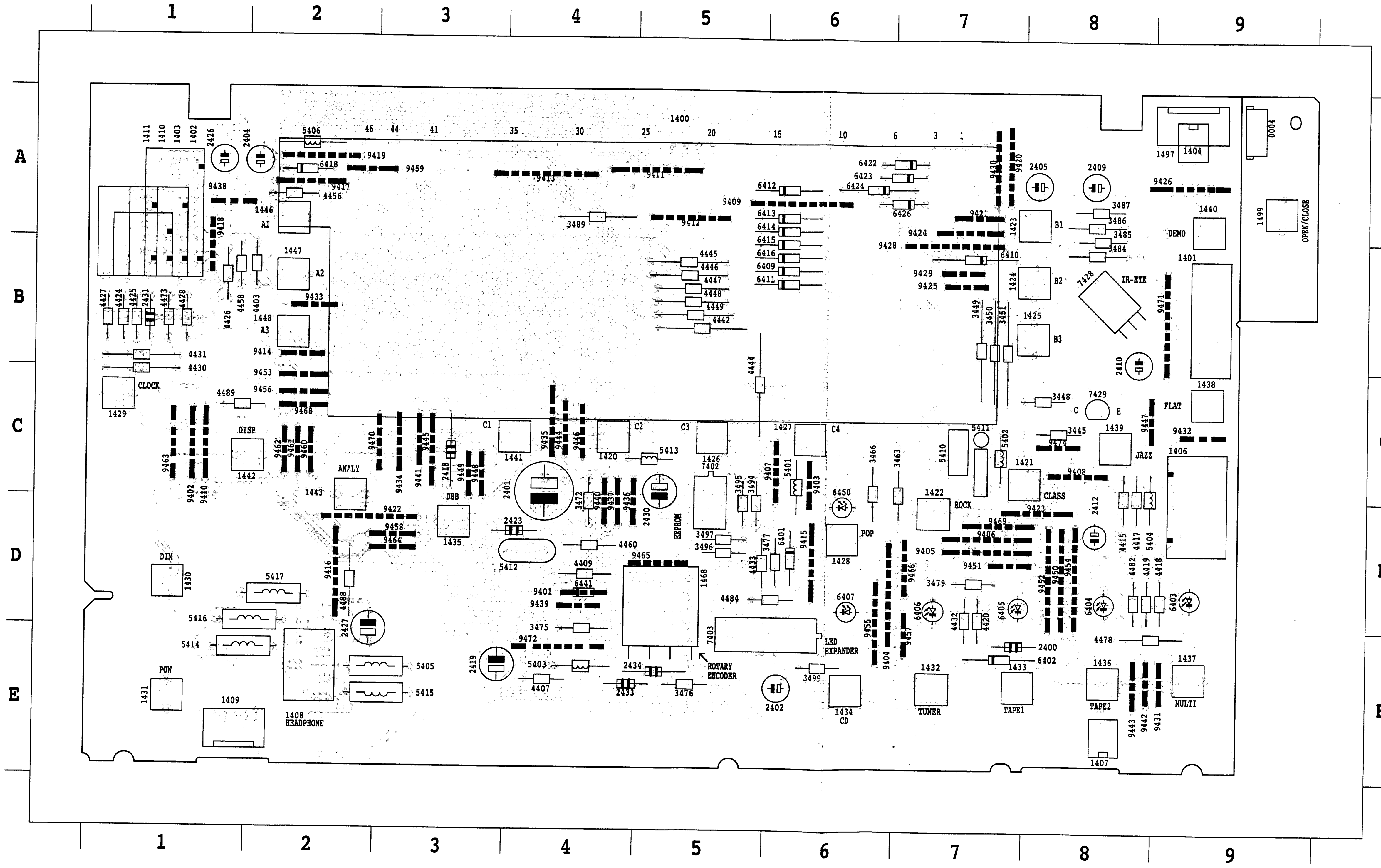
CONTROL BOARD

Layout stage .5

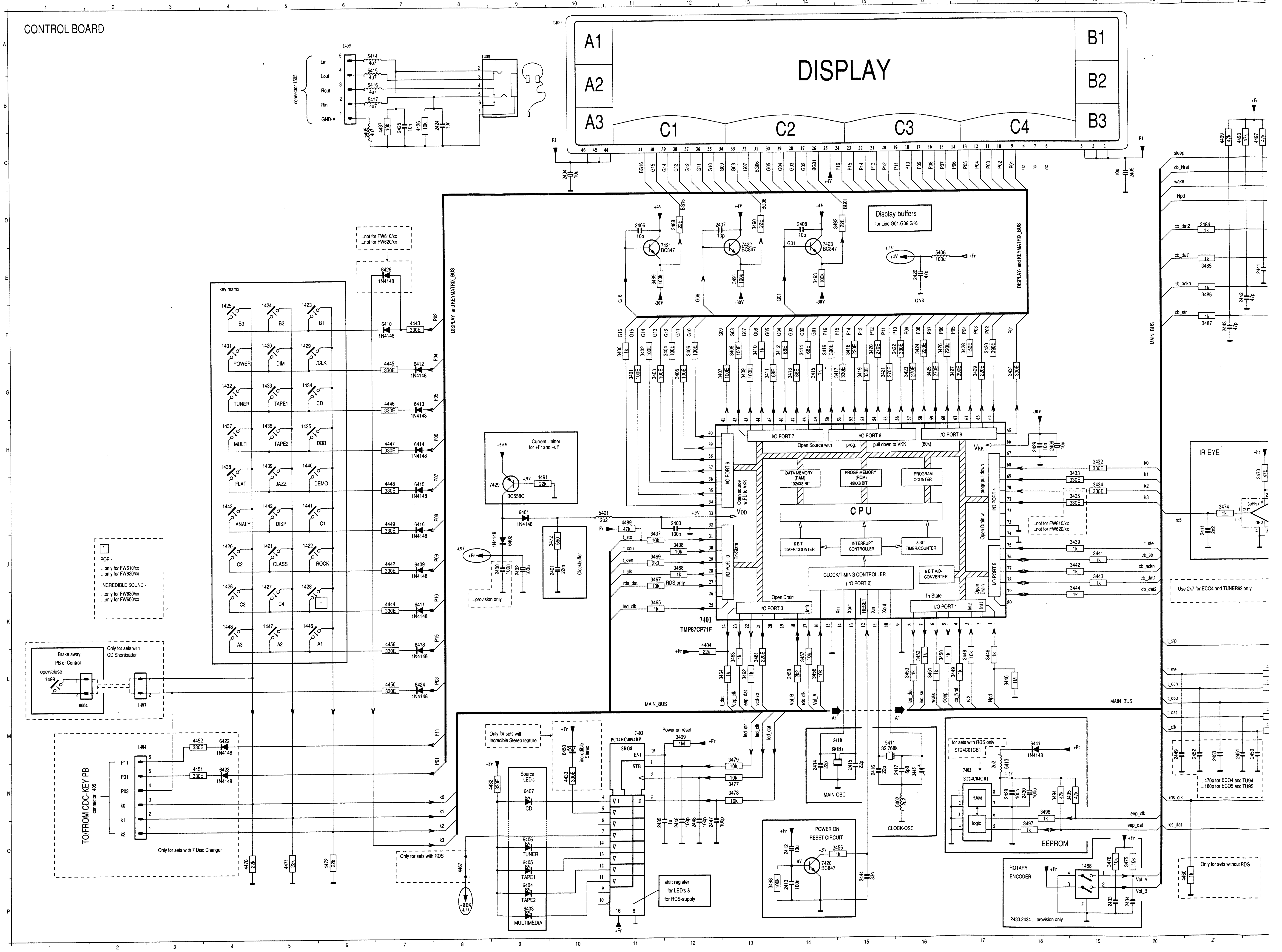
TABLE OF CONTENTS

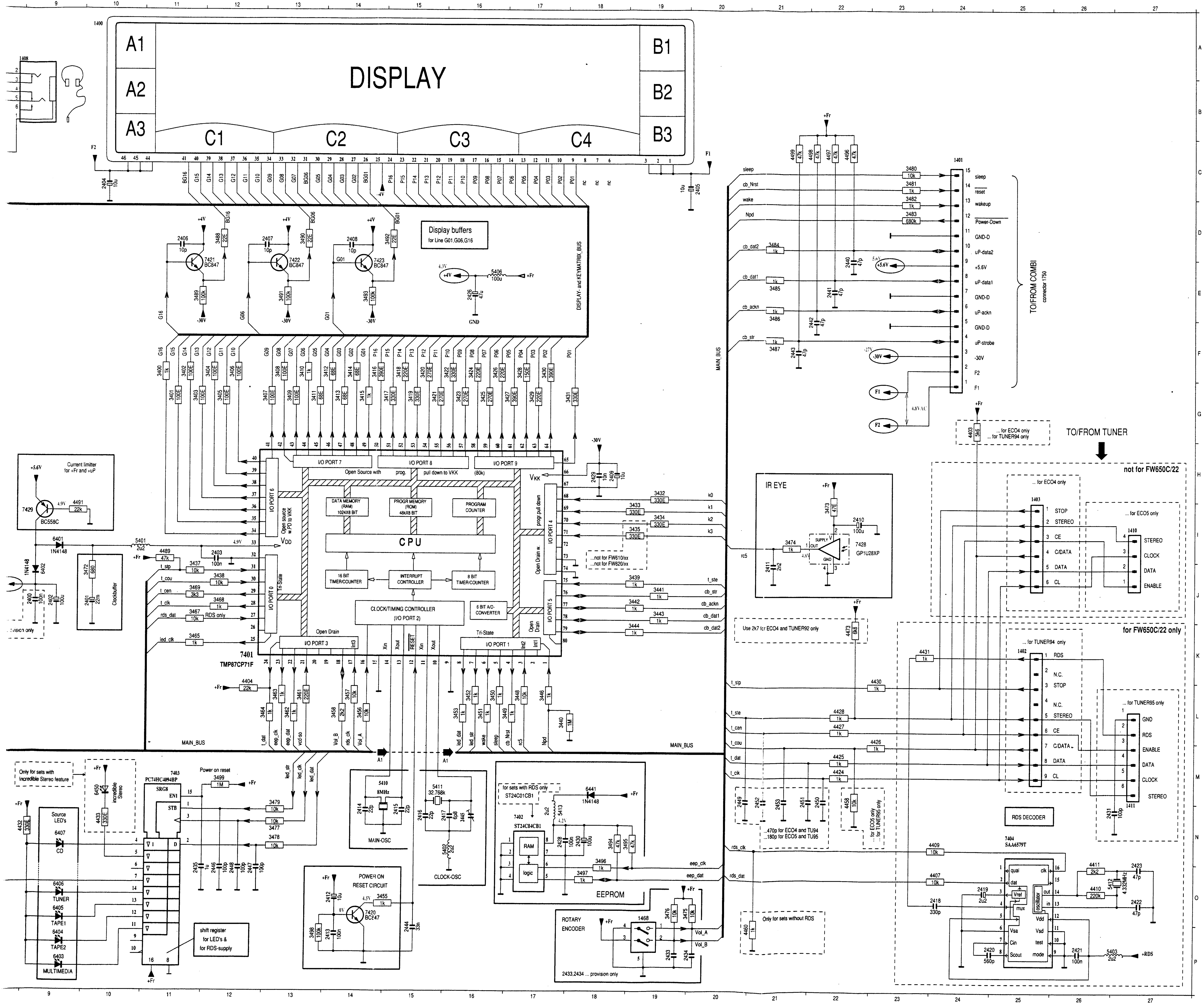
Component layout componentside view 6A-1
Circuit diagram 6A-2
Component layout copperside view 6A-3
Partslist 6A-4

COMPONENT LAYOUT COMPONENTSIDE VIEW


1
2
3
4
5
6
7
8
9
A
B
C
D
E
1400
A1
A2
A3
B1
B2
B3
C1
C2
C3
C4
CLOCK
DISP
ANALY
DBB
EEPROM
POP
ROCK
CLASS
JAZZ
FLAT
DEMO
IR-EYE
OPEN/CLOSE
DIM
POW
HEADPHONE
ROTARY ENCODER
LED EXPANDER
CD
TUNER
TAPE1
TAPE2
MULTI

0004	A	9	3463	C	7	6401	D	6	9440	D	4
1400	A	5	3466	C	6	6402	E	7	9441	C	3
1401	B	9	3472	D	4	6403	D	9	9442	E	8
1402	A	1	3475	E	4	6404	D	8	9443	E	8
1403	A	1	3476	E	5	6405	D	7	9444	C	4
1404	A	9	3477	D	6	6406	D	7	9445	C	3
1406	D	9	3479	D	7	6407	D	6	9446	C	4
1407	E	8	3484	B	8	6409	B	6	9447	C	8
1408	E	2	3485	A	8	6410	B	7	9448	C	3
1409	E	1	3486	A	8	6411	B	6	9449	C	3
1410	B	1	3487	A	8	6412	A	6	9450	D	8
1411	A	1	3489	A	4	6413	A	6	9451	D	7
1420	C	4	3494	D	5	6414	A	6	9452	D	8
1421	C	7	3495	D	5	6415	B	6	9453	C	2
1422	D	7	3496	D	5	6416	B	6	9454	D	8
1423	A	8	3497	D	5	6418	A	2	9455	D	6
1424	B	8	3499	E	6	6422	A	7	9456	C	2
1425	B	8	4403	B	2	6423	A	7	9457	E	7
1426	C	5	4407	E	4	6424	A	6	9458	D	3
1427	C	6	4409	D	4	6426	A	7	9459	A	2
1428	D	6	4415	C	8	6441	D	4	9460	C	2
1429	C	1	4417	C	8	6450	D	6	9461	C	2
1430	D	1	4418	D	9	7402	D	5	9462	C	2
1431	E	1	4419	D	8	7403	E	6	9463	C	1
1432	E	7	4420	D	7	7428	B	8	9464	D	3
1433	E	7	4424	B	1	7429	C	8	9465	D	5
1434	E	6	4425	B	1	9401	D	4	9466	D	7
1435	D	3	4426	B	1	9402	C	1	9468	C	2
1436	E	8	4427	B	1	9403	C	6	9469	D	7
1437	E	9	4428	B	1	9404	D	6	9470	C	3
1438	C	9	4430	C	1	9405	D	7	9471	B	9
1439	C	8	4431	B	1	9406	D	7	9472	E	4
1440	A	9	4432	D	7	9407	C	6	9474	C	8
1441	C	4	4433	D	5	9408	C	8			
1442	C	2	4442	B	5	9409	A	6			
1443	C	2	4444	C	5	9410	C	1			
1446	A	2	4445	B	5	9411	A	5			
1447	B	2	4446	B	5	9412	A	5			
1448	B	2	4447	B	5	9413	A	4			
1468	E	5	4448	B	5	9414	B	2			
1497	A	9	4449	B	5	9415	D	6			
1499	A	9	4456	A	2	9416	D	2			
2400	E	7	4458	B	1	9417	A	2			
2401	C	4	4460	D	4	9418	B	1			
2402	E	6	4473	B	1	9419	A	2			
2404	A	2	4478	E	8	9420	A	7			
2405	A	8	4482	D	8	9421	A	7			
2409	A	8	4484	D	6	9422	D	2			
2410	B	8	4488	D	2	9423	D	8			
2412	D	8	4489	C	1	9424	A	7			
2418	C	3	5401	C	6	9425	B	7			
2419	E	3	5402	C	7	9426	A	9			
2423	D	4	5403	E	4	9428	B	7			
2426	A	1	5404	C	8	9429	B	7			
2427	E	2	5405	E	3	9430	A	7			
2430	C	5	5406	A	2	9431	E	9			
2431	B	1	5410	C	7	9432	C	9			
2433	E	4	5411	C	7	9433	B	2			
2434	E	5	5412	D	4	9434	C	3			
3445	C	8	5413	C	5	9435	C	4			
3448	C	8	5414	E	1	9436	D	4			
3449	B	7	5415	E	3	9437	D	4			
3450	B	7	5416	D	2	9438	A	1			
3451	B	7	5417	D	2	9439	D	4			


CONTROL BOARD
DISPLAY
A1
A2
A3
B1
B2
B3
C1
C2
C3
C4
1400
1409
1408
connector 1505
Lin
Lout
Rout
Rin
GND-A
key matrix
B3
B2
B1
POWER
DIM
T/CLK
TUNER
TAPE1
CD
MULTI
TAPE2
DBB
FLAT
JAZZ
DEMO
ANALY
DISP
C1
C2
CLASS
ROCK
C3
C4
A3
A2
A1
...not for FW610/xx
...not for FW620/xx
DISPLAY and KEYMATRIX_BUS
Display buffers
for Line G01,G06,G16
7421 BC847
7422 BC847
7423 BC847
Current-limitter for +Fr and +uP
7429 BC558C
Clockbuffer
...provision only
POP -
...only for FW610/xx
...only for FW620/xx
INCREDIBLE SOUND -
...only for FW630/xx
...only for FW650/xx
Brake away PB of Control
open/close
Only for sets with CD Shortloader
TO/FROM CDC-KEY PB
connector 1405
Only for sets with 7 Disc Changer
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT 6
I/O PORT 0
I/O PORT 3
I/O PORT 1
I/O PORT 4
I/O PORT 5
DATA MEMORY (RAM) 1024X8 BIT
PROGR MEMORY (ROM) 48KX8 BIT
PROGRAM COUNTER
CPU
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
6 BIT A/D-CONVERTER
7401
TMP87CP71F
MAIN_BUS
Only for sets with Incredible Stereo feature
Source LED's
CD
TUNER
TAPE1
TAPE2
MULTIMEDIA
Only for sets with RDS
PC74HC4094BP
SRG8
shift register for LED's & for RDS-supply
Power on reset
MAIN-OSC
8MHz
32.768k
CLOCK-OSC
POWER ON RESET CIRCUIT
7420 BC847
for sets with RDS only
ST24C01CB1
7402 ST24C04CB1
RAM
logic
EEPROM
ROTARY ENCODER
2433,2434 ... provision only
IR EYE
Use 2k7 for ECO4 and TUNER92 only
...470p for ECO4 and TU94
...180p for ECO5 and TU95
Only for sets without RDS
sleep
cb_Nrst
wake
Npd
cb_dat2
cb_dat1
cb_ackn
cb_str
rc5
t_stp
t_ste
t_cen
t_cou
t_dat
t_clk
rds_clk
rds_dat
eep_clk
eep_dat
Vol_A
Vol_B
led_str
led_clk
led_dat
k0
k1
k2
k3


DISPLAY
A1
A2
A3
B1
B2
B3
C1
C2
C3
C4
1400
1408
F2
F1
Display buffers
for Line G01,G06,G16
7421 BC847
7422 BC847
7423 BC847
DISPLAY- and KEYMATRIX_BUS
Current limitter for +Fr and +uP
7429 BC558C
Clockbuffer
7401
TMP87CP71F
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT 6
I/O PORT 0
I/O PORT 4
I/O PORT 5
I/O PORT 3
I/O PORT 1
DATA MEMORY (RAM) 1024X8 BIT
PROGR MEMORY (ROM) 48KX8 BIT
PROGRAM COUNTER
CPU
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
6 BIT A/D-CONVERTER
Open Source with prog. pull down to VKK (80k)
Open Drain
Tri-State
MAIN_BUS
sleep
cb_Nrst
wake
Npd
cb_dat2
cb_dat1
cb_ackn
cb_str
1401
sleep
reset
wakeup
Power-Down
GND-D
uP-data2
+5.6V
uP-data1
GND-D
uP-ackn
GND-D
uP-strobe
-30V
F2
F1
TO/FROM COMBI
connector 1750
IR EYE
7428 GP1U28XP
...not for FW610/xx
...not for FW620/xx
Use 2k7 for ECO4 and TUNER92 only
TO/FROM TUNER
not for FW650C/22
... for ECO4 only
... for ECO5 only
1403
STOP
STEREO
CE
C/DATA
DATA
CL
1410
STEREO
CLOCK
DATA
ENABLE
for FW650C/22 only
... for TUNER94 only
1402
RDS
N.C.
STOP
N.C.
STEREO
CE
C/DATA
DATA
CL
... for TUNER95 only
1411
GND
RDS
ENABLE
DATA
CLOCK
STEREO
...470p for ECO4 and TU94
...180p for ECO5 and TU95
... for ECO5 only
... for TUNER95 only
RDS DECODER
7404 SAA6579T
Only for sets without RDS
Only for sets with Incredible Stereo feature
Incredible Stereo
Source LED's
6407 CD
6406 TUNER
6405 TAPE1
6404 TAPE2
6403 MULTIMEDIA
7403 PC74HC4094BP SRG8
Power on reset
shift register for LED's & for RDS-supply
POWER ON RESET CIRCUIT
7420 BC847
5410 8MHz
MAIN-OSC
5411 32.768k
CLOCK-OSC
for sets with RDS only ST24C01CB1
7402 ST24C04CB1
RAM
logic
EEPROM
ROTARY ENCODER
1468
Vol_A
Vol_B
2433,2434 ... provision only
9
10
11
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20
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22
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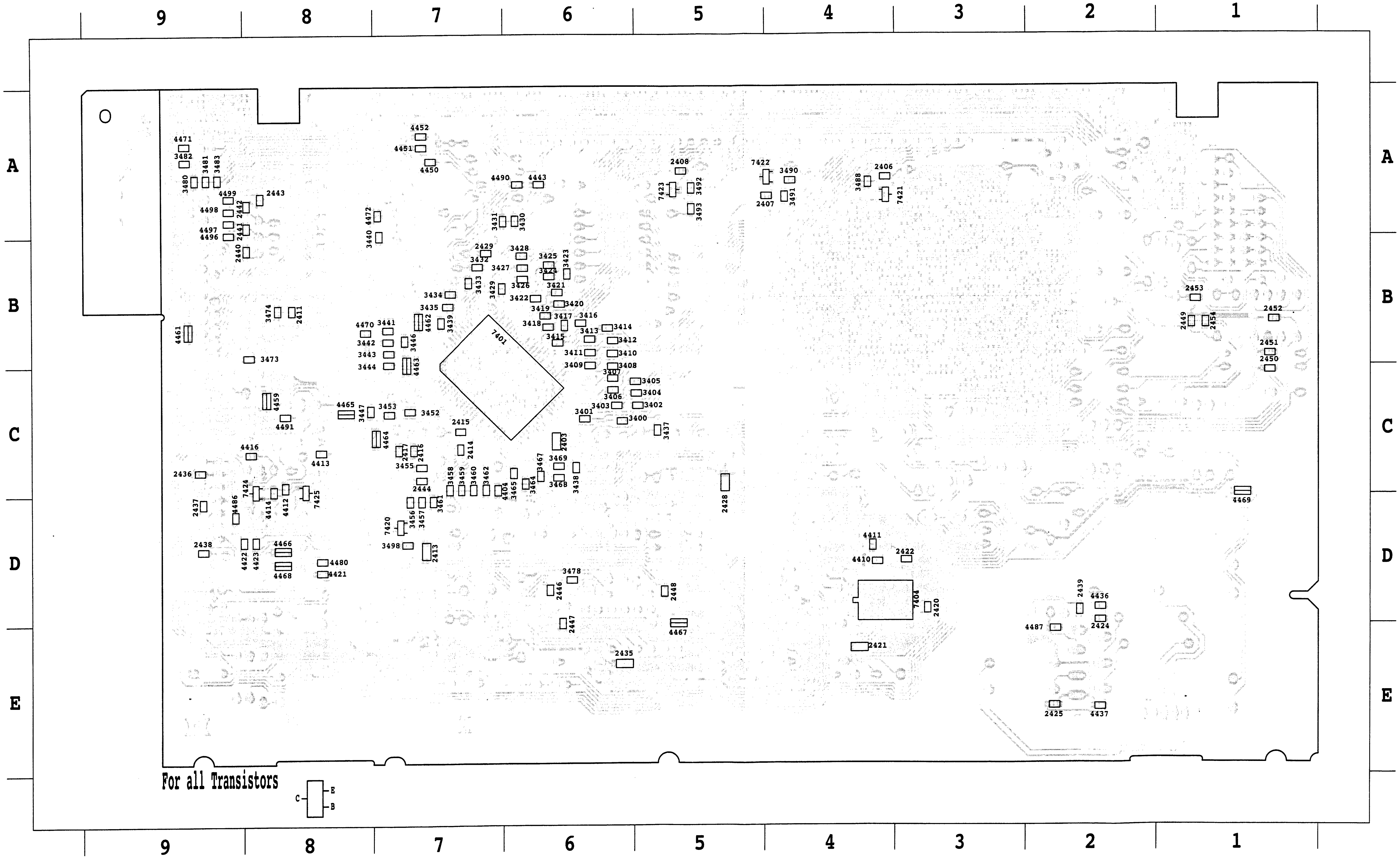
24
25
26
27
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P

0004	L 1
1400	A10
1401	C24
1402	K25
1403	H25
1404	M 3
1406	D 2
1408	A 8
1409	A 6
1410	I27
1411	N27
1420	J 4
1421	J 5
1422	J 5
1423	F 5
1424	F 5
1425	F 4
1426	J 4
1427	J 5
1428	J 5
1429	F 5
1430	F 5
1431	F 4
1432	G 4
1433	G 5
1434	G 5
1435	H 5
1436	H 5
1437	H 4
1438	H 4
1439	H 5
1440	H 5
1441	I 5
1442	I 5
1443	I 4
1446	K 5
1447	K 5
1448	K 4
1468	O19
1497	L 3
1499	L 1
2400	J 9
2401	J10
2402	J 9
2403	I12
2404	C10
2405	C20
2406	D11
2407	D13
2408	D14
2409	H18
2410	I22
2411	J21
2412	O14
2413	P14
2414	N14
2415	N15
2416	N15
2417	N16
2418	O24
2419	O24
2420	P25
2421	P26
2422	O27
2423	O27
2424	B 8
2425	B 7
2426	E16
2428	N17
2429	H18
2430	N18
2431	N26
2433	P19
2434	P20
2435	O11
2436	B 4
2437	C 4
2438	C 3
2439	C 7
2440	E22
2441	E22
2442	F22
2443	F21
2444	P15
2445	N16
2446	O12
2447	O12
2448	O12
2449	M20
2450	M22
2451	M21
2452	M21
2453	M21
2454	P23
3400	F11
3401	G11
3402	F11
3403	G11
3404	F12
3405	G12
3406	F12
3407	G13
3408	F13
3409	G13
3410	F13
3411	G13
3412	F14
3413	G14
3414	F14
3415	G14
3416	F14
3417	G15
3418	F15
3419	G15
3420	F15
3421	G15
3422	F16
3423	G16
3424	F16
3425	G16
3426	F16
3427	G17
3428	F17
3429	G17
3430	F17
3431	G18
3432	H19
3433	I19
3434	I19
3435	I19
3437	J11
3438	J12
3439	J19
3440	L17
3441	J19
3442	J19
3443	J19
3444	K19
3445	L18
3446	L17
3447	L17
3448	L17
3449	L17
3450	L16
3451	L16
3452	L16
3453	L16
3455	O15
3456	L14
3457	L14
3458	L14
3459	L14
3460	L13
3461	L13
3462	L13
3463	L13
3464	L13
3465	K11
3466	K12
3467	J11
3468	J12
3469	J11
3472	J10
3473	I22
3474	I21
3475	O20
3476	O19
3477	N13
3478	N13
3479	N13
3480	C23
3481	C23
3482	C23
3483	D23
3484	D21
3485	E21
3486	E21
3487	F21
3488	D12
3489	E11
3490	D13
3491	E13
3492	D15
3493	E14
3494	N18
3495	N19
3496	N18
3497	O18
3498	P13
3499	M12
4403	G24
4404	L12
4407	O24
4409	N24
4410	O26
4411	N26
4418	B 3
4419	B 3
4420	B 3
4421	C 3
4422	C 4
4423	B 4
4424	M22
4425	M22
4426	L23
4427	L22
4428	L22
4430	K23
4431	K23
4432	N 9
4433	N10
4436	B 7
4437	B 7
4442	J 7
4443	F 7
4444	K 7
4445	G 7
4446	G 7
4447	H 7
4448	I 7
4449	I 7
4450	L 7
4451	N 3
4452	M 3
4456	K 7
4458	M22
4460	P21
4464	D 4
4470	O 4
4471	O 5
4472	O 6
4473	K22
4478	B 4
4480	C 4
4482	B 3
4484	L 9
4486	B 4
4487	B 8
4488	A 8
4489	I11
4490	I19
4491	I 9
4496	C22
4497	C22
4498	C22
4499	C21
5401	I10
5402	N16
5403	P27
5405	C 6
5406	E16
5410	M15
5411	M15
5412	O27
5413	N17
5414	A 7
5415	A 7
5416	B 7
5417	B 7
6401	I 9
6402	J 9
6403	P 9
6404	P 9
6405	O 9
6406	O 9
6407	N 9
6409	J 7
6410	F 7
6411	K 7
6412	G 7
6413	G 7
6414	H 7
6415	I 7
6416	I 7
6418	L 7
6422	M 4
6423	N 4
6424	L 7
6426	E 7
6441	M18
6450	M10
7401	H18
7402	N17
7403	M11
7404	N25
7420	O14
7421	E11
7422	E13
7423	E14
7428	I22
7429	I 9
9401	M18

COMPONENT LAYOUT COPPERSIDE VIEW


9
8
7
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5
4
3
2
1
A
B
C
D
E
7401
7404
7420
7421
7422
7423
7424
7425
For all Transistors
C
E
B

2403	C	6
2406	A	4
2407	A	4
2408	A	5
2411	B	8
2413	D	7
2414	C	7
2415	C	7
2416	C	7
2417	C	7
2420	D	3
2421	E	4
2422	D	3
2424	D	2
2425	E	2
2428	C	5
2429	B	7
2435	E	6
2436	C	9
2437	D	9
2438	D	9
2439	D	2
2440	B	8
2441	A	8
2442	A	8
2443	A	8
2444	C	7
2446	D	6
2447	D	6
2448	D	5
2449	B	1
2450	C	1
2451	B	1
2452	B	1
2453	B	1
2454	B	1
3400	C	6
3401	C	6
3402	C	5
3403	C	6
3404	C	5
3405	C	5
3406	C	6
3407	C	6
3408	C	6
3409	B	6
3410	B	6
3411	B	6
3412	B	6
3413	B	6
3414	B	6
3415	B	6
3416	B	6
3417	B	6
3418	B	6
3419	B	6
3420	B	6
3421	B	6
3422	B	6
3423	B	6
3424	B	6
3425	B	6
3426	B	6
3427	B	6

ELECTRICAL PARTSLIST CONTROL BOARD

MISCELLANEOUS

1400	4822 130 91488	DISPLAY
1408	4822 267 31506	PHONE SOCKET
1420	4822 276 13114	TACT SWITCH
1421	4822 276 13114	TACT SWITCH
1422	4822 276 13114	TACT SWITCH
1423	4822 276 13114	TACT SWITCH
1424	4822 276 13114	TACT SWITCH
1425	4822 276 13114	TACT SWITCH
1426	4822 276 13114	TACT SWITCH
1427	4822 276 13114	TACT SWITCH
1428	4822 276 13114	TACT SWITCH
1429	4822 276 13114	TACT SWITCH
1430	4822 276 13114	TACT SWITCH
1431	4822 276 13114	TACT SWITCH
1432	4822 276 13114	TACT SWITCH
1433	4822 276 13114	TACT SWITCH
1434	4822 276 13114	TACT SWITCH
1435	4822 276 13114	TACT SWITCH
1436	4822 276 13114	TACT SWITCH
1437	4822 276 13114	TACT SWITCH
1438	4822 276 13114	TACT SWITCH
1439	4822 276 13114	TACT SWITCH
1440	4822 276 13114	TACT SWITCH
1441	4822 276 13114	TACT SWITCH
1442	4822 276 13114	TACT SWITCH
1443	4822 276 13114	TACT SWITCH
1446	4822 276 13114	TACT SWITCH
1447	4822 276 13114	TACT SWITCH
1448	4822 276 13114	TACT SWITCH
1468	4822 101 21261	ROTARY ENCODER
1499	4822 276 13114	TACT SWITCH
7428	4822 130 10165	GP1U28XP

CAPACITORS

2401	4822 124 80818	22mF	20%	5,5V
2402	4822 124 41584	100µF	20%	10V
2403©	4822 122 33496	100nF	10%	63V
2404	4822 124 41579	10µF	20%	50V
2405	4822 124 41579	10µF	20%	50V
2406©	5322 122 32448	10pF	5%	50V
2407©	5322 122 32448	10pF	5%	50V
2408©	5322 122 32448	10pF	5%	50V
2409	4822 124 41579	10µF	20%	50V
2410	4822 124 41584	100µF	20%	10V
2411©	4822 122 33175	2,2nF	20%	50V
2412	4822 124 22403	10µF	20%	16V
2413©	4822 122 33496	100nF	10%	63V
2414©	5322 122 32658	22pF	5%	50V
2415©	5322 122 32658	22pF	5%	50V
2416©	5322 122 32658	22pF	5%	50V
2417©	5322 122 32269	6,8pF	5%	50V
2418	4822 126 12787	330pF	10%	50V
2419	4822 124 41576	2,2µF	20%	50V
2420©	5322 122 34099	470pF	10%	63V
2421©	4822 122 33496	100nF	10%	63V
2422©	5322 122 32452	47pF	5%	50V
2423	4822 122 33848	47pF	5%	50V
2424©	4822 122 33177	10nF	20%	50V
2425©	4822 122 33177	10nF	20%	50V

CAPACITORS

2426	4822 124 40433	47µF	20%	25V
2428©	4822 122 33496	100nF	10%	63V
2429©	4822 122 33177	10nF	20%	50V
2430	4822 124 42234	100µF	20%	6,3V
2431	4822 122 33195	100pF	10%	50V
2435©	4822 126 11692	1µF	20%	16V
2440©	5322 122 32452	47pF	5%	50V
2441©	5322 122 32452	47pF	5%	50V
2442©	5322 122 32452	47pF	5%	50V
2443©	5322 122 32452	47pF	5%	50V
2444©	4822 122 33342	33nF	10%	63V
2446©	5322 122 32531	100pF	5%	50V
2447©	5322 122 32531	100pF	5%	50V
2448©	5322 122 32531	100pF	5%	50V
2450©	4822 126 10326	180pF	5%	
2450©	5322 122 34099	470pF	10%	63V
2451©	4822 126 10326	180pF	5%	
2451©	5322 122 34099	470pF	10%	63V
2453©	5322 122 34099	470pF	10%	63V

RESISTORS

3400©	4822 051 10102	1kΩ	2%	0,25W
3401©	4822 051 20101	100Ω	5%	0,1W
3402©	4822 051 20101	100Ω	5%	0,1W
3403©	4822 051 20101	100Ω	5%	0,1W
3404©	4822 051 20101	100Ω	5%	0,1W
3405©	4822 051 20101	100Ω	5%	0,1W
3406©	4822 051 20101	100Ω	5%	0,1W
3407©	4822 051 20101	100Ω	5%	0,1W
3408©	4822 051 20101	100Ω	5%	0,1W
3409©	4822 051 20101	100Ω	5%	0,1W
3410©	4822 051 10102	1kΩ	2%	0,25W
3411©	4822 051 20689	68Ω	5%	0,1W
3412©	4822 051 20689	68Ω	5%	0,1W
3413©	4822 051 20689	68Ω	5%	0,1W
3414©	4822 051 20689	68Ω	5%	0,1W
3415©	4822 051 10102	1kΩ	2%	0,25W
3416©	4822 051 20391	390Ω	5%	0,1W
3417©	4822 051 20331	330Ω	5%	0,1W
3418©	4822 051 20221	220Ω	5%	0,1W
3419©	4822 051 20331	330Ω	5%	0,1W
3420©	4822 051 20271	270Ω	5%	0,1W
3421©	4822 051 20271	270Ω	5%	0,1W
3422©	4822 051 20331	330Ω	5%	0,1W
3423©	4822 051 20271	270Ω	5%	0,1W
3424©	4822 051 20221	220Ω	5%	0,1W
3425©	4822 051 20271	270Ω	5%	0,1W
3426©	4822 051 20221	220Ω	5%	0,1W
3427©	4822 051 20391	390Ω	5%	0,1W
3428©	4822 117 10353	150Ω	5%	0,1W
3429©	4822 051 20221	220Ω	5%	0,1W
3430©	4822 051 20391	390Ω	5%	0,1W
3431©	4822 051 20331	330Ω	5%	0,1W
3432©	4822 051 20331	330Ω	5%	0,1W
3433©	4822 051 20331	330Ω	5%	0,1W
3434©	4822 051 20331	330Ω	5%	0,1W
3435©	4822 051 20331	330Ω	5%	0,1W
3437©	4822 051 20103	10kΩ	5%	0,1W
3438©	4822 051 20103	10kΩ	5%	0,1W
3439©	4822 051 10102	1kΩ	2%	0,25W
3440©	4822 051 20105	1MΩ	5%	0,1W

ELECTRICAL PARTSLIST CONTROL BOARD

RESISTORS

3441©	4822 051 10102	1kΩ	2%	0,25W
3442©	4822 051 10102	1kΩ	2%	0,25W
3443©	4822 051 10102	1kΩ	2%	0,25W
3444©	4822 051 10102	1kΩ	2%	0,25W
3446©	4822 051 10102	1kΩ	2%	0,25W
3448	4822 116 83864	10kΩ	5%	0,5W
3449	4822 050 11002	1kΩ	5%	0,2W
3450	4822 050 11002	1kΩ	5%	0,2W
3451	4822 050 11002	1kΩ	5%	0,2W
3452©	4822 051 10102	1kΩ	2%	0,25W
3453©	4822 051 10102	1kΩ	2%	0,25W
3455©	4822 051 10102	1kΩ	2%	0,25W
3456©	4822 051 20103	10kΩ	5%	0,1W
3457©	4822 051 20103	10kΩ	5%	0,1W
3458©	4822 117 11449	2,2kΩ	1%	0,1W
3462©	4822 051 10102	1kΩ	2%	0,25W
3463	4822 050 11002	1kΩ	5%	0,2W
3464©	4822 051 10102	1kΩ	2%	0,25W
3465©	4822 051 10102	1kΩ	2%	0,25W
3467©	4822 051 20103	10kΩ	5%	0,1W
3468©	4822 051 10102	1kΩ	2%	0,25W
3468©	4822 051 20103	10kΩ	5%	0,1W
3469©	4822 051 20332	3,3kΩ	5%	0,1W
3472	4822 116 52228	680Ω	5%	0,5W
3473©	4822 051 20479	47Ω	5%	0,1W
3474©	4822 051 10102	1kΩ	2%	0,25W
3475	4822 116 83864	10kΩ	5%	0,5W
3476	4822 116 83864	10kΩ	5%	0,5W
3477	4822 116 83864	10kΩ	5%	0,5W
3478©	4822 051 20103	10kΩ	5%	0,1W
3479	4822 116 83864	10kΩ	5%	0,5W
3480©	4822 051 20103	10kΩ	5%	0,1W
3481©	4822 051 10102	1kΩ	2%	0,25W
3482©	4822 051 10102	1kΩ	2%	0,25W
3483©	4822 051 20684	680kΩ	5%	0,1W
3484	4822 050 11002	1kΩ	5%	0,2W
3485	4822 050 11002	1kΩ	5%	0,2W
3486	4822 050 11002	1kΩ	5%	0,2W
3487	4822 050 11002	1kΩ	5%	0,2W
3488©	4822 051 20229	22Ω	5%	0,1W
3489	4822 116 52234	100kΩ	5%	0,5W
3490©	4822 051 20229	22Ω	5%	0,1W
3491©	4822 051 20104	100kΩ	5%	0,1W
3492©	4822 051 20229	22Ω	5%	0,1W
3493©	4822 051 20104	100kΩ	5%	0,1W
3494	4822 116 52284	47kΩ	5%	0,5W
3495	4822 116 52284	47kΩ	5%	0,5W
3496	4822 050 11002	1kΩ	5%	0,2W
3497	4822 050 11002	1kΩ	5%	0,2W
3498©	4822 051 20104	100kΩ	5%	0,1W
3499	4822 116 52235	1MΩ	5%	0,5W
4403	4822 116 52289	5,6kΩ	5%	0,16W
4404©	4822 051 20223	22kΩ	5%	0,1W
4407	4822 116 83864	10kΩ	5%	0,5W
4409	4822 116 83864	10kΩ	5%	0,5W
4410©	4822 051 20224	220kΩ	5%	0,1W
4411©	4822 117 11449	2,2kΩ	1%	0,1W
4424	4822 050 11002	1kΩ	5%	0,2W
4425	4822 050 11002	1kΩ	5%	0,2W
4426	4822 050 11002	1kΩ	5%	0,2W

RESISTORS

4427	4822 050 11002	1kΩ	5%	0,2W
4428	4822 050 11002	1kΩ	5%	0,2W
4430	4822 050 11002	1kΩ	5%	0,2W
4431	4822 050 11002	1kΩ	5%	0,2W
4432	4822 116 52219	330Ω	5%	0,5W
4433	4822 116 52219	330Ω	5%	0,5W
4436©	4822 051 20103	10kΩ	5%	0,1W
4437©	4822 051 20103	10kΩ	5%	0,1W
4442	4822 116 52219	330Ω	5%	0,5W
4443©	4822 051 20331	330Ω	5%	0,1W
4444	4822 116 52219	330Ω	5%	0,5W
4445	4822 116 52219	330Ω	5%	0,5W
4446	4822 116 52219	330Ω	5%	0,5W
4447	4822 116 52219	330Ω	5%	0,5W
4448	4822 116 52219	330Ω	5%	0,5W
4449	4822 116 52219	330Ω	5%	0,5W
4450©	4822 051 20331	330Ω	5%	0,1W
4456	4822 116 52219	330Ω	5%	0,5W
4458	4822 116 83864	10kΩ	5%	0,5W
4460	4822 050 11002	1kΩ	5%	0,2W
4461©	4822 051 10008	CHIP JUMPER 1206		
4462©	4822 051 10008	CHIP JUMPER 1206		
4463©	4822 051 10008	CHIP JUMPER 1206		
4465©	4822 051 10008	CHIP JUMPER 1206		
4467©	4822 051 10008	CHIP JUMPER 1206		
4469©	4822 051 10008	CHIP JUMPER 1206		
4470©	4822 051 20223	22kΩ	5%	0,1W
4471©	4822 051 20223	22kΩ	5%	0,1W
4472©	4822 051 20223	22kΩ	5%	0,1W
4473	4822 116 52263	2,7kΩ	5%	0,5W
4473	4822 116 52296	6,8kΩ	5%	0,5W
4489	4822 116 52284	47kΩ	5%	0,5W
4491©	4822 051 20223	22kΩ	5%	0,1W
4496©	4822 051 20473	47kΩ	5%	0,1W
4497©	4822 051 20473	47kΩ	5%	0,1W
4498©	4822 051 20473	47kΩ	5%	0,1W
4499©	4822 051 20473	47kΩ	5%	0,1W

COILS

5401	4822 157 62552	2,2µH
5402	4822 157 62552	2,2µH
5403	4822 157 62552	2,2µH
5405	4822 157 53139	4,7µH
5406	4822 157 52333	100µH
5410	5322 242 73697	CER.RES. 8MHz
5411	4822 242 70938	CRYSTAL 32,768kHz
5412	4822 242 72195	XTAL 4,332MHz
5413	4822 157 62552	2,2µH
5414	4822 157 53139	4,7µH
5415	4822 157 53139	4,7µH
5416	4822 157 53139	4,7µH
5417	4822 157 53139	4,7µH

DIODES

6401	4822 130 30621	1N4148
6402	4822 130 30621	1N4148
6403	4822 130 82978	LED LTL-16KPE
6404	4822 130 82978	LED LTL-16KPE
6405	4822 130 82978	LED LTL-16KPE

ELECTRICAL PARTSLIST CONTROL BOARD

DIODES

6406	4822 130 82978	LED LTL-16KPE
6407	4822 130 82978	LED LTL-16KPE
6409	4822 130 30621	1N4148
6410	4822 130 30621	1N4148
6411	4822 130 30621	1N4148
6412	4822 130 30621	1N4148
6413	4822 130 30621	1N4148
6414	4822 130 30621	1N4148
6415	4822 130 30621	1N4148
6416	4822 130 30621	1N4148
6418	4822 130 30621	1N4148
6424	4822 130 30621	1N4148
6426	4822 130 30621	1N4148
6441	4822 130 30621	1N4148
6450	4822 130 83363	LED LTL-16KGE

TRANSISTORS

7420©	5322 130 42755	BC847C
7421©	5322 130 42755	BC847C
7422©	5322 130 42755	BC847C
7423©	5322 130 42755	BC847C
7429	5322 130 60068	BC558C

INTEGRATED CIRCUITS

7401©	4822 209 13586	TMP87CP71F	
7402	4822 209 31508	ST24C01B1	for FW630/22 only
7402	4822 209 52316	ST24C04B1	not for FW630/22
7403	5322 209 11532	PC74HC4094P	
7404	4822 209 31981	SAA6579T/V1	

4364

FW630

A96-365

Service
Service
Service

Product Service Group CE Audio

Service Information

Already published Service Informations: A96-352

Additional repair hints for the Power Board

In the Power management we distinguish between three different modes.

Power on	(set operating)
Stand by	(set not operating, display shows time)
Eco Mode	(set not operating, display dark)

These modes are selected by the microprocessor (7690) on the COMBI BOARD via the line STAND BY. This output port of the microprocessor is a tri-state output.

In **POWER ON** the stand by line is high (approx. 4,8V .. 5V).

In **STAND BY** mode the Stand by line has high impedance. In this case the voltage of the stand by line is determined by voltage divider R3367 / R3368. You should measure about 3V.

In **ECO MODE** the stand by line is low.

We know two different FAULT CONDITIONS.

1.) Set doesn't wake up from Stand by.

(Set inoperative, display shows time)

Some possibilities how this may happen.

a) The NTC line is low (or nearly low).
In this case the microprocessor thinks that the temperature of the transformer is too high and switches the set back in stand by. Check therefore voltage divider R3380 / NTC respectively the line to pin 77 of microprocessor 7690 on COMBI BOARD.

b) The "CLIPPING DETECTOR" (drawn in chapter 11-5 of Service Manual) is active.
This can be checked on pin 2 of connector 1301 on the POWER BOARD. If this line is low the microprocessor switches the set to standby (again). One possible reason why the clipping detector is active is a defective power stage. Also a defective transistor 7305 or 7307 is possible.

c) The primary control is NOT fed by the secondary part.
See also circuit description on page 11-1 of Service Manual. Check voltage on pin1 of optocoupler 7353 (should be approx. 1V). Check transistor 7368 and 7369.

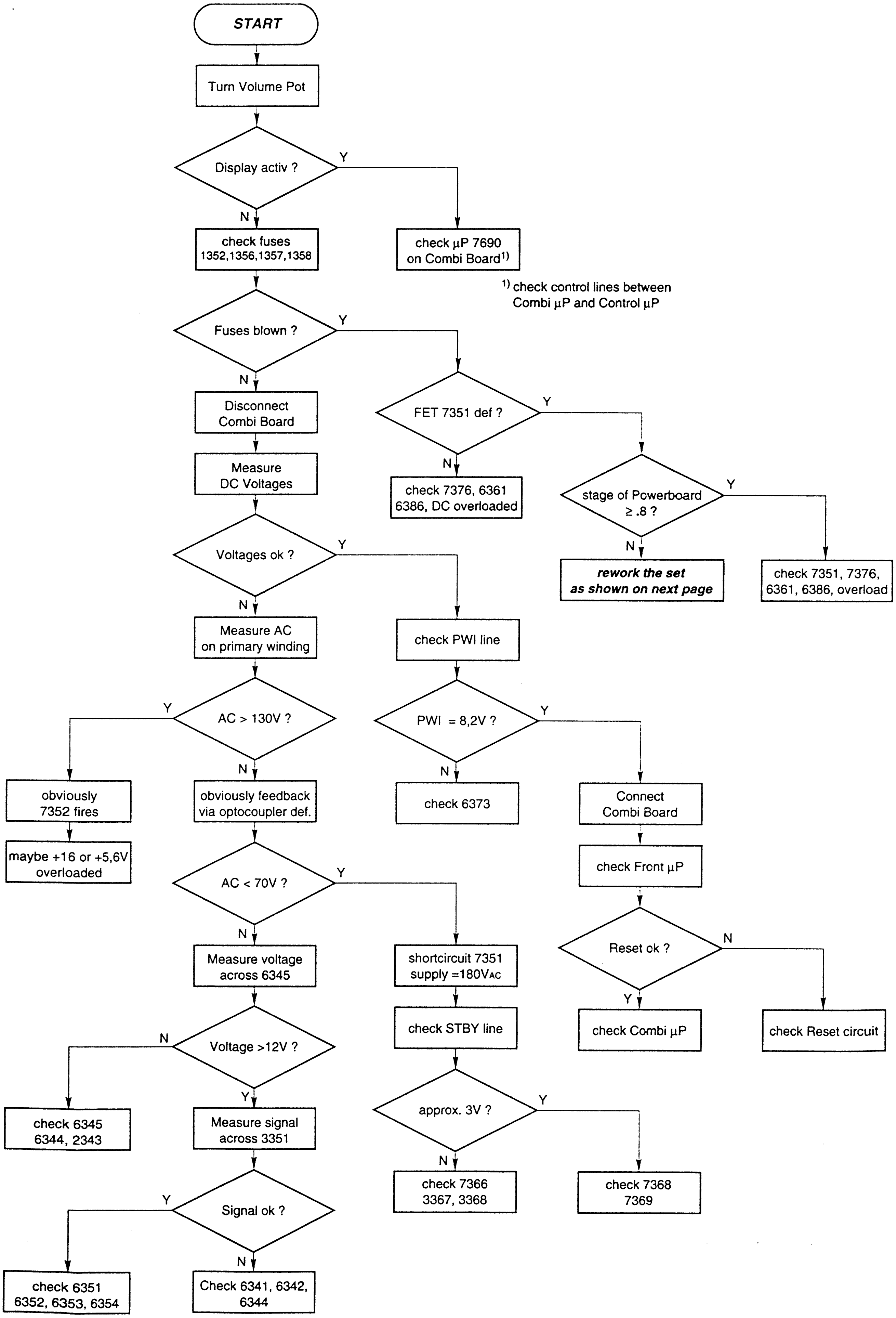
1996-10-15

(GB) 4822 725 25001

CS 52 895

2.) *Set dead.*

(Set inoperative, display dark)

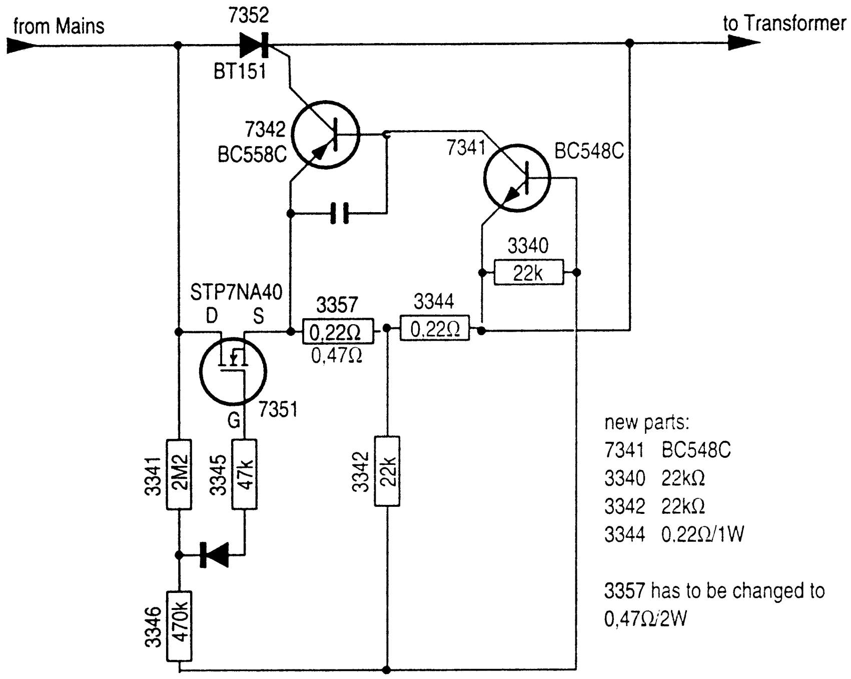

START
Turn Volume Pot
Display activ ?
Y
N
check fuses
1352,1356,1357,1358
check µP 7690
on Combi Board1)
Fuses blown ?
Y
N
Disconnect
Combi Board
FET 7351 def ?
Y
N
Measure
DC Voltages
check 7376, 6361
6386, DC overloaded
stage of Powerboard
≥ .8 ?
Y
N
rework the set
as shown on next page
check 7351, 7376,
6361, 6386, overload
Voltages ok ?
Y
N
Measure AC
on primary winding
check PWI line
AC > 130V ?
Y
N
PWI = 8,2V ?
Y
N
obviously
7352 fires
obviously feedback
via optocoupler def.
check 6373
Connect
Combi Board
maybe +16 or +5,6V
overloaded
check Front µP
AC < 70V ?
Y
N
Reset ok ?
N
Y
Measure voltage
across 6345
shortcircuit 7351
supply =180VAC
check STBY line
check Combi µP
check Reset circuit
Voltage >12V ?
N
Y
approx. 3V ?
Y
N
check 6345
6344, 2343
Measure signal
across 3351
check 7366
3367, 3368
check 7368
7369
Signal ok ?
Y
N
check 6351
6352, 6353, 6354
Check 6341, 6342,
6344

[1] check control lines between Combi µP and Control µP

Rework instruction Power Board for layout stages .5, .6 and .7

(The layout stage can be identified by the last digit of the 12-figure number, printed in the copper pattern.)
Rework has only to be done in case FET 7351 is defective.

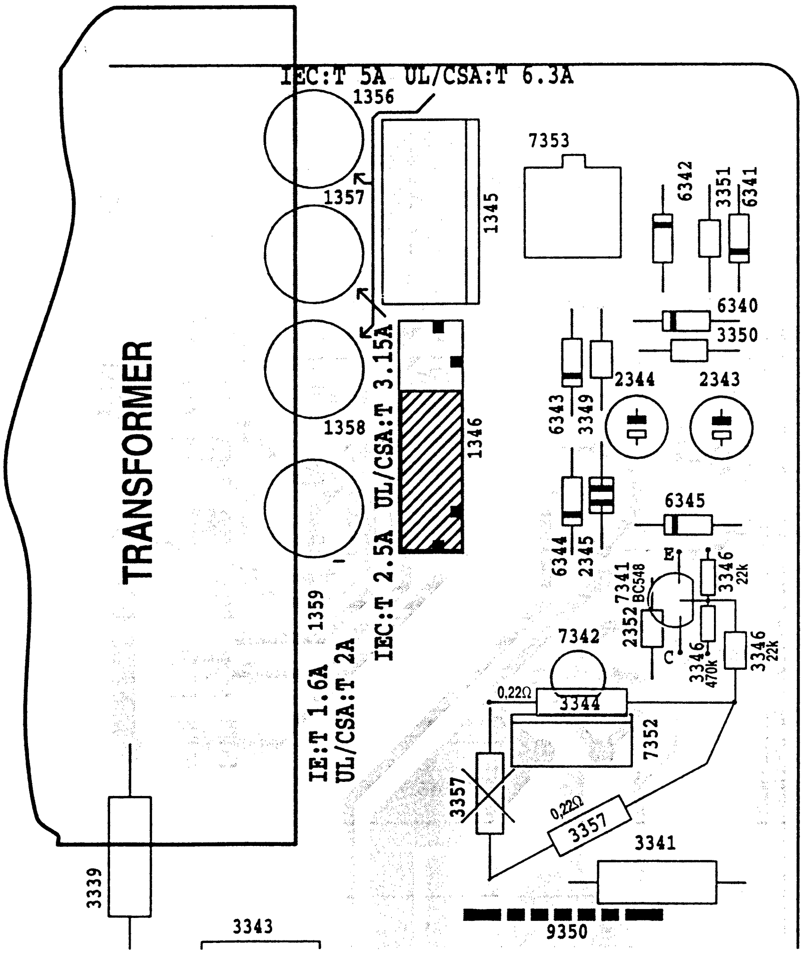
Circuit Diagram


from Mains
7352
BT151
to Transformer
7342
BC558C
7341
BC548C
3340
22k
STP7NA40
D S
3357
0,22Ω
0,47Ω
3344
0,22Ω
G
7351
3341
2M2
3345
47k
3342
22k
3346
470k

new parts:
7341 BC548C
3340 22kΩ
3342 22kΩ
3344 0.22Ω/1W

3357 has to be changed to
0,47Ω/2W

Component Layout

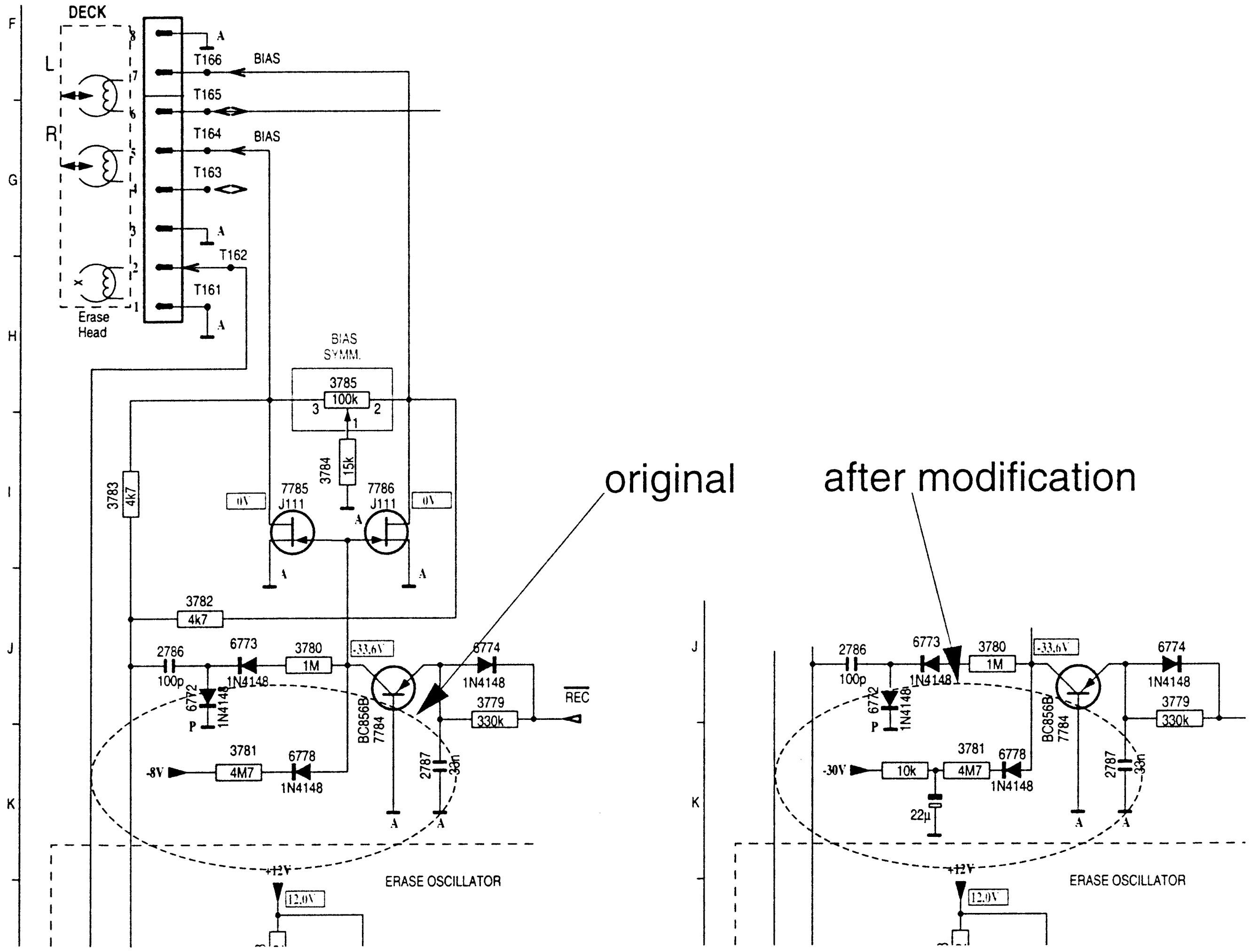

IEC:T 5A UL/CSA:T 6.3A
1356
7353
6342
3351
6341
1357
1345
6340
3350
TRANSFORMER
UL/CSA:T 3.15A
2344
2343
1358
1346
6343
3349
6345
6344
2345
7341
BC548
2352
E
C
3346
22k
3346
470k
3346
22k
7342
1359
IEC:T 2.5A
IE:T 1.6A
UL/CSA:T 2A
0,22Ω
3344
7352
3357
0,22Ω
3357
3341
3339
3343
9350

The new components are on the primary side of the transformer. Use an insulation tape to avoid shortcircuits.

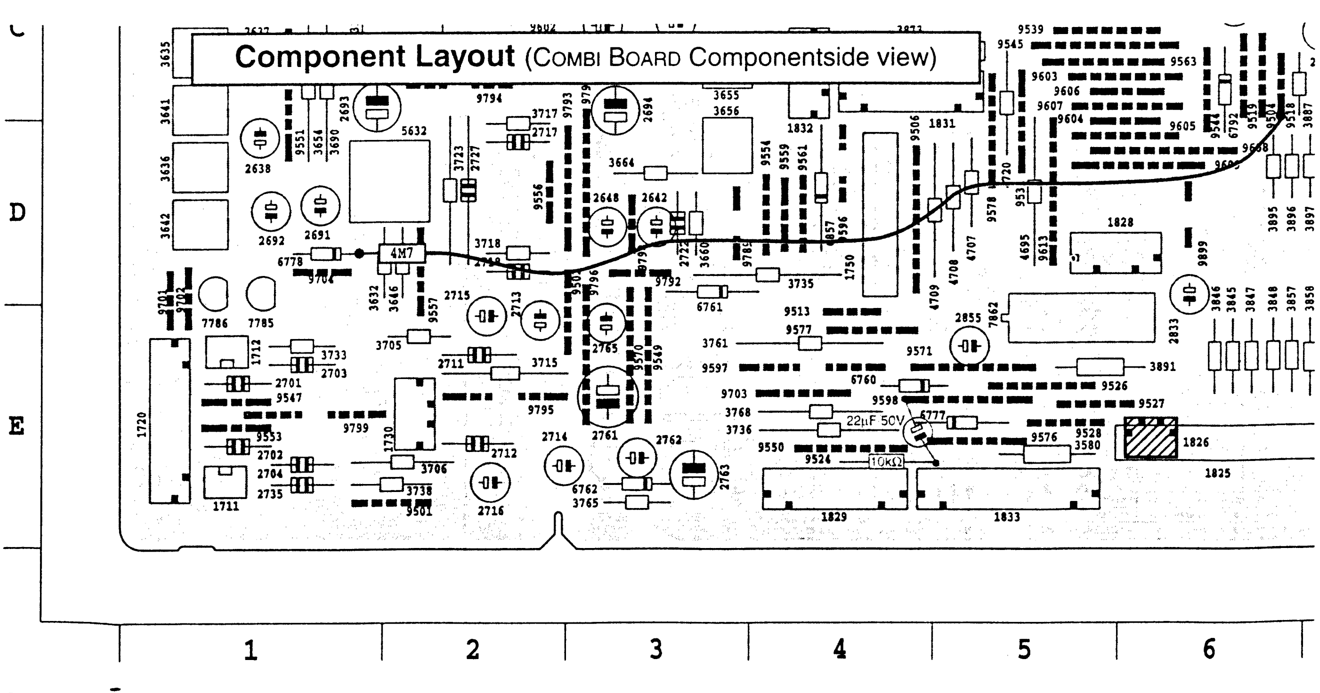
Symptom : Bias oscillator is not working properly.
In some cases it might happen that the bias oscillator is not functioning properly. In that case an AC voltage of about 3V will be measured on erase head instead of 30V. This phenomenon is caused by tolerances of FET J111.

Cure : To solve this problem following actions should be performed:

1. Replace wirebridge 9524 by resistor 10kΩ.
2. Connect an electrolytic capacitor 22µF/50V (4822 124 22337) as shown on picture below.
3. Remove SMD resistor 3781.
4. Add resistor 4,7MΩ between cathode of 6778 and wirebridge 9518.



DECK
L
R
Erase Head
T166
BIAS
T165
T164
BIAS
T163
T162
T161
A
BIAS SYMM.
3785
100k
3784
15k
3783
4k7
7785 J111
7786 J111
0V
3782
4k7
2786
100p
6773
1N4148
3780
1M
-33,6V
6774
1N4148
3779
330k
REC
6772
1N4148
P
BC856B 7784
3781
4M7
6778
1N4148
-8V
2787
33n
+12V
12,0V
ERASE OSCILLATOR
original
after modification
-30V
10k
22µ
F
G
H
I
J
K


Component Layout (Combi Board Componentside view)

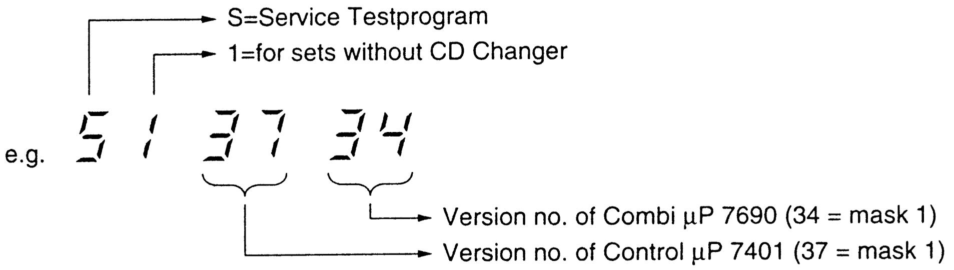
4M7
6778
22µF 50V
6777
10kΩ
9524
9518
9598
9550
1828
1829
1833
1826
1825
1720
1730
D
E
1
2
3
4
5
6

Microprocessor overview:

In course of production the software of both microprocessors have been improved. Therefore new masks of microprocessors have been introduced. ***It is not allowed to mix up different masks.***

This means:

Combi Board µP with mask 1 works only with Front Board µP mask 1 (a.s.o.). Because there are no exact introduction dates available the correct version of the µP must be identified via the printing on the microprocessor or via the Service Testprogram (see chapter 3-5 of Service Manual)


S=Service Testprogram
1=for sets without CD Changer
e.g.
S1 37 34
Version no. of Combi µP 7690 (34 = mask 1)
Version no. of Control µP 7401 (37 = mask 1)

Microprocessor 7690 on Combi Board			
	Printing on µP	Version no.	Service Code
Mask 1	TMP87CM71F-6332	Sx yy 34	4822 209 91092
Mask 2	TMP87CM71F-6378	Sx yy 25	4822 209 91093
Mask 3	TMP87CM71F-6497	Sx yy 06	4822 209 13587

Microprocessor 7401 on Control Board			
	Printing on µP	Version no.	Service Code
Mask 1	TMP87CP71F-6325	Sx 37 zz	4822 900 10975
Mask 2	TMP87CP71F-6372	Sx 24 zz	4822 209 90995
Mask 3	TMP87CP71F-6494	Sx 14 zz	4822 209 13586

Hint for µP with mask 2:

The display test does not show the patterns published in the Service Manual.

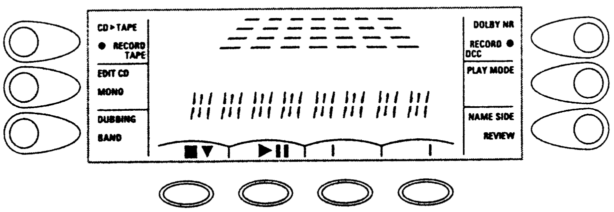

CD▸TAPE
● RECORD TAPE
EDIT CD
MONO
DUBBING
BAND
DOLBY NR
RECORD ● DCC
PLAY MODE
NAME SIDE
REVIEW

Fig.2 (shown in Manual)

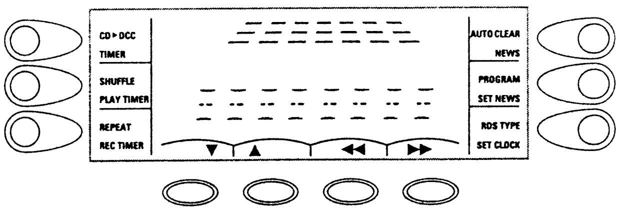

CD▸DCC
TIMER
SHUFFLE
PLAY TIMER
REPEAT
REC TIMER
AUTO CLEAR
NEWS
PROGRAM
SET NEWS
RDS TYPE
SET CLOCK

Fig.3 (shown in Manual)

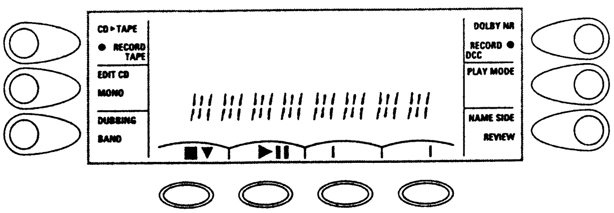

CD▸TAPE
● RECORD TAPE
EDIT CD
MONO
DUBBING
BAND
DOLBY NR
RECORD ● DCC
PLAY MODE
NAME SIDE
REVIEW

Fig.2 / Mask 2

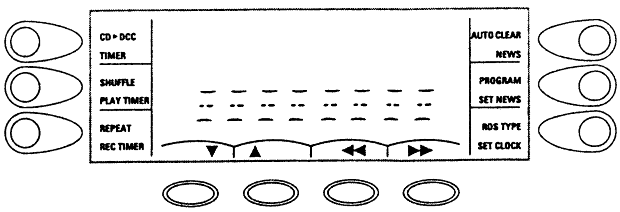
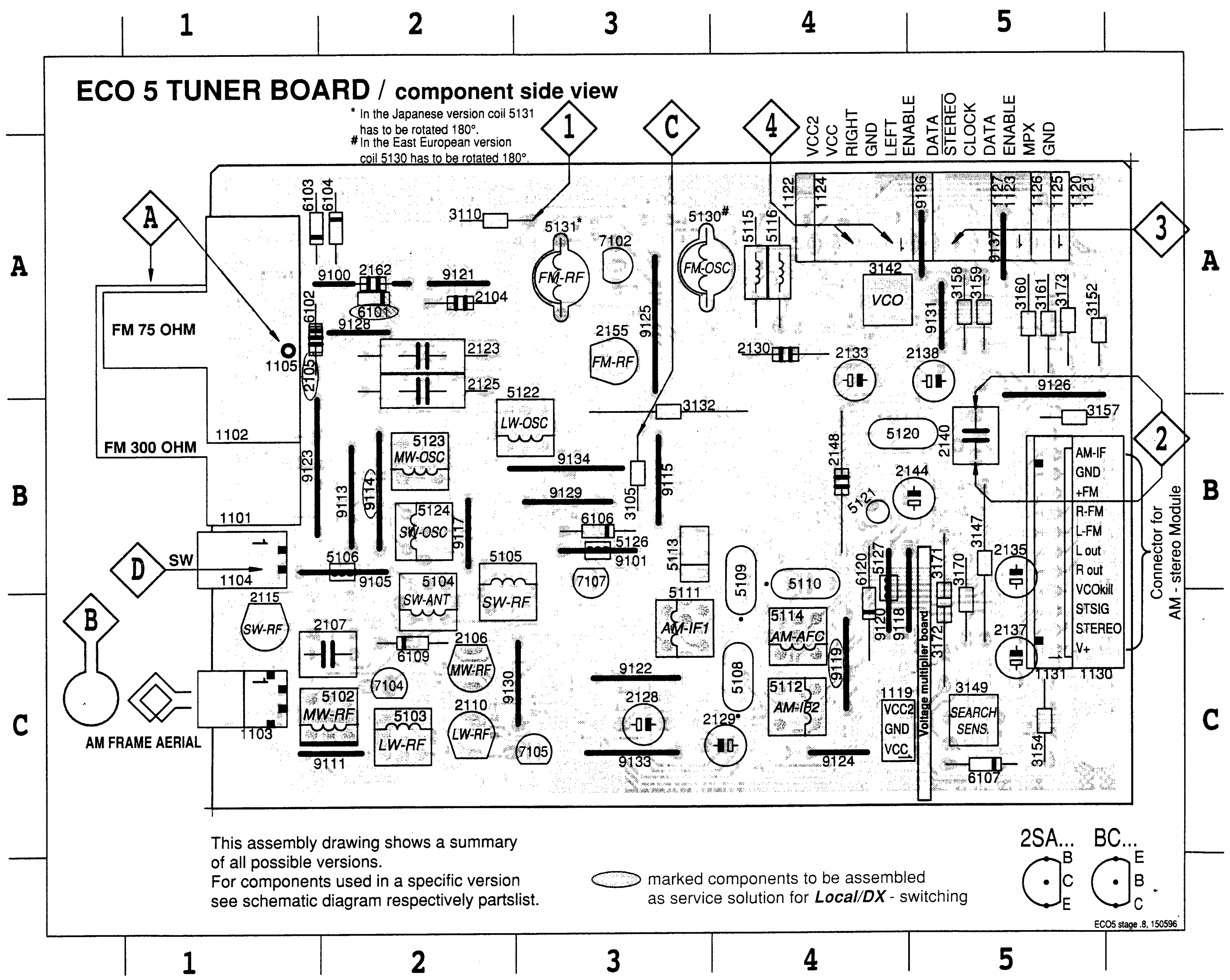

CD▸DCC
TIMER
SHUFFLE
PLAY TIMER
REPEAT
REC TIMER
AUTO CLEAR
NEWS
PROGRAM
SET NEWS
RDS TYPE
SET CLOCK

Fig.3 / Mask 2

1101	A1	2106	C2	2137	C5	3147	B5	3172	C5	5112	C4	5127	B4	7102	A3	9117	B2	9129	B3
1102	A1	2107	C2	2138	A5	3149	C5	3173	A5	5113	B3	5130	A3	7104	C2	9118	B4	9130	C3
1103	C1	2110	C2	2140	B5	3152	A5	5102	C2	5114	C4	5131	A3	7105	C3	9119	C4	9131	A5
1104	B1	2115	C1	2144	B5	3154	C5	5103	C2	5115	A4	6101	A2	7107	B3	9120	B4	9133	C3
1105	A1	2123	A2	2148	B4	3157	B5	5104	C2	5116	A4	6102	A1	9100	A2	9121	A2	9134	B3
1119	C5	2125	A2	2155	A3	3158	A5	5105	B2	5120	B4	6103	A1	9101	B3	9122	C3	9136	A5
1120	A5	2128	C3	2162	A2	3159	A5	5106	B2	5121	B4	6104	A2	9105	B2	9123	B1	9137	A5
1130	B5	2129	C4	3105	B3	3160	A5	5108	C4	5122	B3	6106	B3	9111	C2	9124	C4		
1131	B5	2130	A4	3110	A2	3161	A5	5109	B4	5123	B2	6107	C5	9113	B2	9125	A3		
2104	A2	2133	A4	3132	B3	3170	C5	5110	B4	5124	B2	6109	C2	9114	B2	9126	B5		
2105	A1	2135	B5	3142	A4	3171	C5	5111	C3	5126	B3	6120	C4	9115	B3	9128	A2		


1
2
3
4
5
A
B
C
FM 75 OHM
FM 300 OHM
SW
AM FRAME AERIAL
FM-RF
FM-OSC
VCO
MW-OSC
LW-OSC
SW-OSC
SW-ANT
SW-RF
MW-RF
LW-RF
AM-IF1
AM-AFC
AM-IF2
SEARCH SENS.
Voltage multiplier board
VCC2
VCC
RIGHT
GND
LEFT
ENABLE
DATA
STEREO
CLOCK
DATA
ENABLE
MPX
GND
AM-IF
GND
+FM
R-FM
L-FM
L out
R out
VCOkill
STSIG
STEREO
V+
Connector for AM - stereo Module
2SA...
BC...
E
C
B

ECO 5 TUNER BOARD / component side view

* In the Japanese version coil 5131 has to be rotated 180°.
# In the East European version coil 5130 has to be rotated 180°.

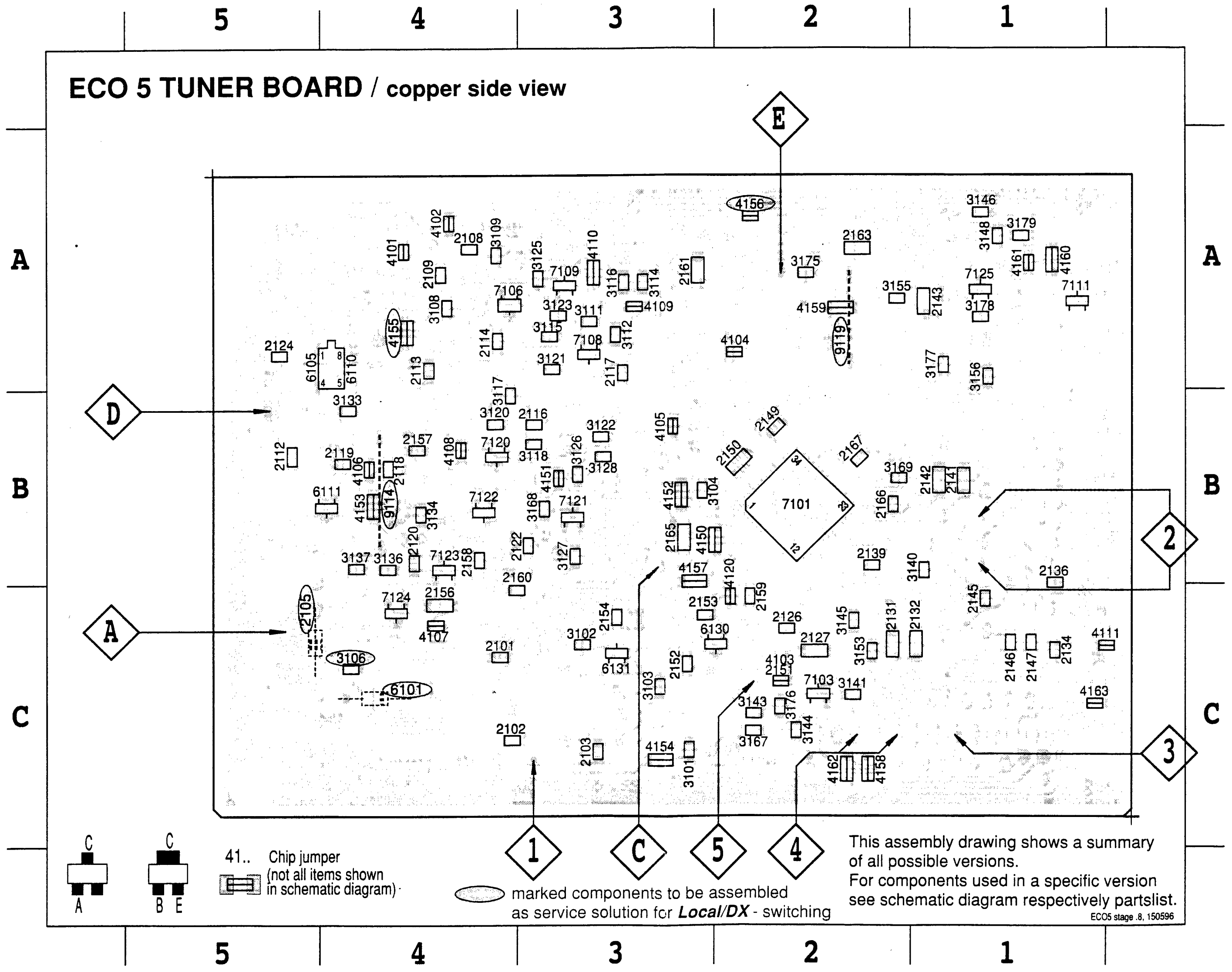
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for *Local/DX* - switching

ECO5 stage .8. 150596

2101	C4	2119	B4	2141	B1	2154	C3	3101	C3	3116	A3
2102	C4	2120	B4	2142	B1	2156	C4	3102	C3	3117	B4
2103	C3	2122	B3	2143	A1	2157	B4	3103	C3	3118	B3
2108	A4	2124	A5	2145	C1	2158	B4	3104	B3	3120	B4
2109	A4	2126	C2	2146	C1	2159	C2	3106	C4	3121	A3
2112	B5	2127	C2	2147	C1	2160	C4	3108	A4	3122	B3
2113	A4	2131	C2	2149	B2	2161	A3	3109	A4	3123	A3
2114	A4	2132	C1	2150	B2	2163	A2	3111	A3	3125	A3
2116	B3	2134	C1	2151	C2	2165	B3	3112	A3	3126	B3
2117	A3	2136	B1	2152	C3	2166	B2	3114	A3	3127	B3
2118	B4	2139	B2	2153	C3	2167	B2	3115	A3	3128	B3

3133	B4	3153	C2	4101	A4	4120	C2	4160	A1	7106	A4
3134	B4	3155	A2	4102	A4	4150	B2	4161	A1	7108	A3
3136	B4	3156	A1	4103	C2	4151	B3	4162	C1	7109	A3
3137	B4	3167	C2	4104	A2	4152	B3	4163	C1	7111	A1
3140	B1	3168	B3	4105	B3	4153	B4	6105	A4	7120	B4
3141	C2	3169	B2	4106	B4	4154	C3	6110	A4	7121	B3
3143	C2	3175	A2	4107	C4	4155	A4	6111	B4	7122	B4
3144	C2	3176	C2	4108	B4	4156	A2	6130	C2	7123	B4
3145	C2	3177	A1	4109	A3	4157	B3	6131	C3	7124	C4
3146	A1	3178	A1	4110	A3	4158	C2	7101	B2	7125	A1
3148	A1	3179	A1	4111	C1	4159	A2	7103	C2		

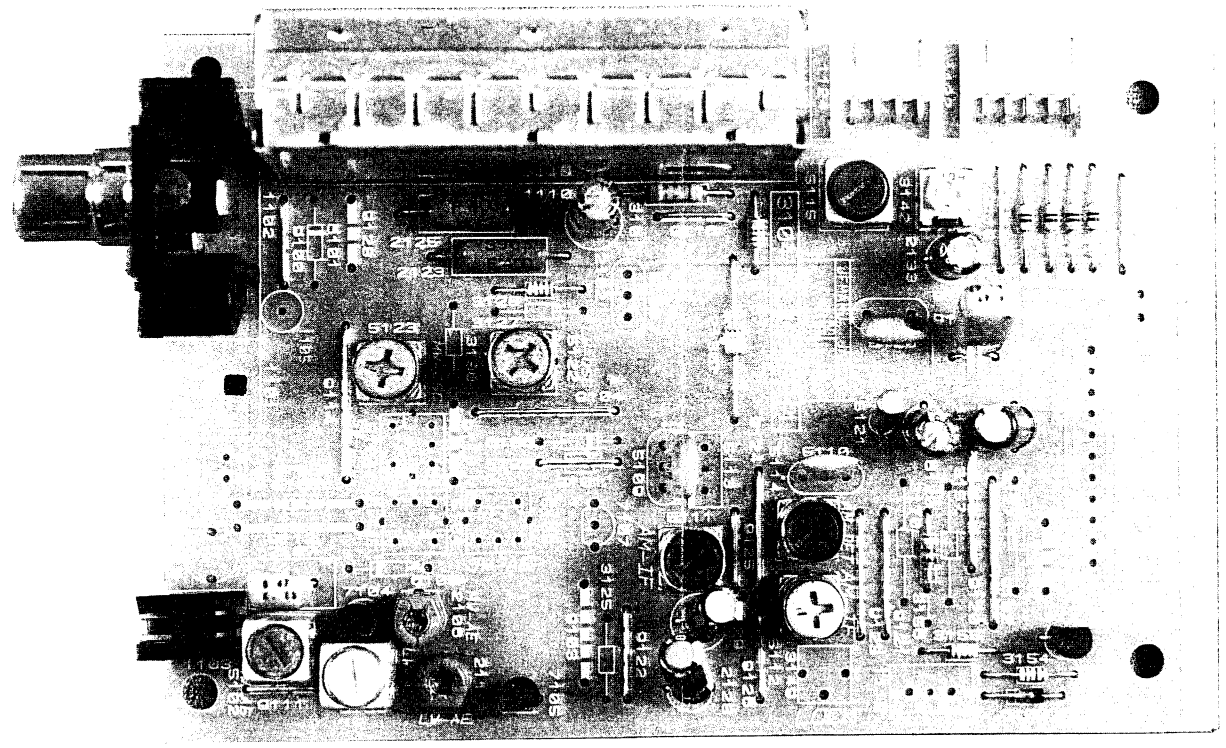

5
4
3
2
1
A
B
C
7101
C
A
C
B E
41..
Chip jumper (not all items shown in schematic diagram)

ECO 5 TUNER BOARD / copper side view

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for *Local/DX* - switching

ECO5 stage .8. 150596



TUNER 95 BOARD

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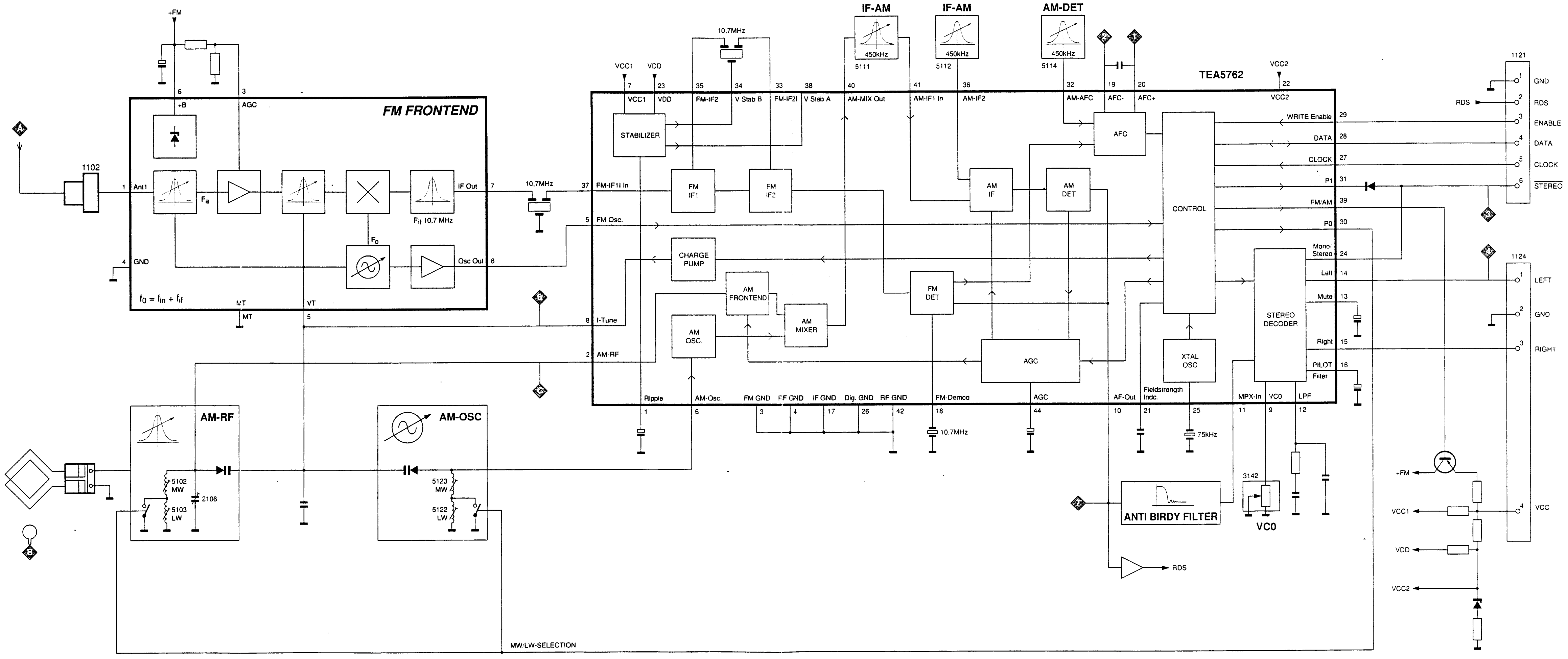
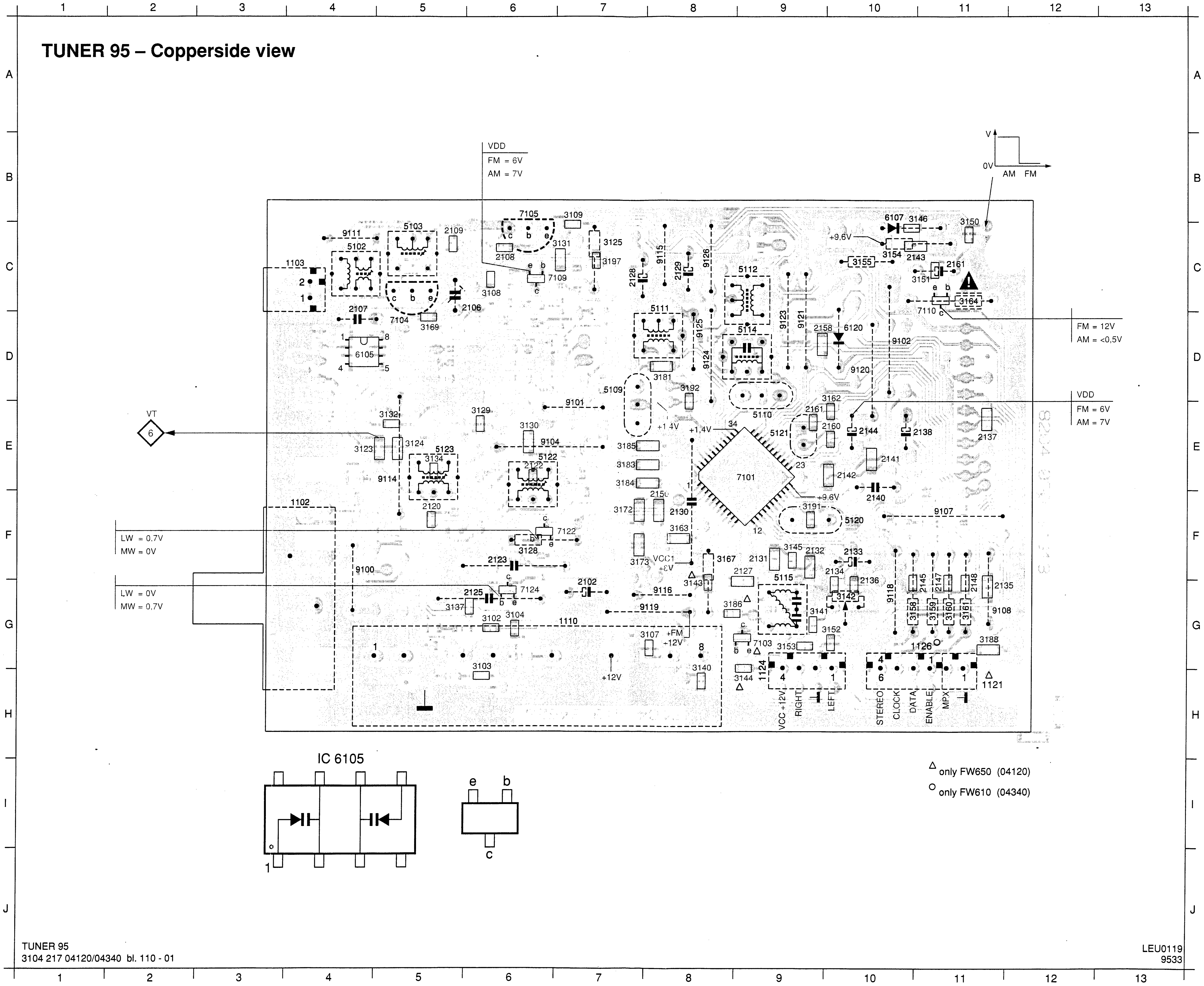
Adjustmant table 7D-2
Component layout...7D-2
Circuit diagram..7D-3
Partslist 7D-4

BLOCKDIAGRAM


+FM
6
3
+B
AGC
FM FRONTEND
1102
1
Ant1
Fa
IF Out
7
Fif 10,7 MHz
Fo
4
GND
Osc Out
8
f0 = fin + fif
MT
VT
MT
5
10,7MHz
AM-RF
5102
MW
5103
LW
2106
AM-OSC
5123
MW
5122
LW
MW/LW-SELECTION
VCC1
VDD
10,7MHz
IF-AM
450kHz
5111
IF-AM
450kHz
5112
AM-DET
450kHz
5114
TEA5762
VCC2
7
23
35
34
33
38
40
41
36
32
19
20
22
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
VCC2
STABILIZER
37
FM-IF1I In
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
5
FM Osc.
CHARGE PUMP
AM FRONTEND
AM MIXER
FM DET
8
I-Tune
AM OSC.
2
AM-RF
AGC
XTAL OSC
STEREO DECODER
WRITE Enable
29
DATA
28
CLOCK
27
P1
31
FM/AM
39
P0
30
Mono/ Stereo
24
Left
14
Mute
13
Right
15
PILOT Filter
16
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VC0
LPF
1
6
3
4
17
26
42
18
10.7MHz
44
10
21
25
75kHz
11
9
12
ANTI BIRDY FILTER
3142
VC0
RDS
1121
1
GND
RDS
2
RDS
3
ENABLE
4
DATA
5
CLOCK
6
STEREO
1124
1
LEFT
2
GND
3
RIGHT
+FM
VCC1
4
VCC
VDD
VCC2

TUNER 95 – Copperside view


1
2
3
4
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7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
J
VDD
FM = 6V
AM = 7V
V
0V
AM FM
FM = 12V
AM = <0,5V
VDD
FM = 6V
AM = 7V
VT
6
LW = 0.7V
MW = 0V
LW = 0V
MW = 0.7V
1103
1102
1110
1124
1126
1121
6105
6107
6120
7101
7103
7104
7105
7109
7110
7122
7124
5102
5103
5109
5110
5111
5112
5114
5115
5120
5121
5122
5123
+9,6V
+1,4V
+1,4V
+9,6V
VCC1
+8V
+FM
+12V
+12V
VCC +12V
RIGHT
LEFT
STEREO
CLOCK
DATA
ENABLE
MPX
IC 6105
e
b
c

△ only FW650 (04120)

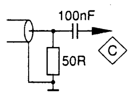
○ only FW610 (04340)

1102	F4	3181	D8
1103	C3	3183	E7
1110	G7	3184	E7
1121	H11	3185	E7
1124	H9	3186	G8
1126	G10	3188	G11
2102	G7	3191	F9
2106	C5	3192	D8
2107	D4	3197	C7
2108	C6	5102	C4
2109	C5	5103	C5
2120	F5	5109	D7
2122	E6	5110	E9
2123	F6	5111	C8
2125	G5	5112	C9
2127	F8	5114	D9
2128	C7	5115	G9
2129	C8	5120	F10
2130	F8	5121	E9
2131	F9	5122	E6
2132	F9	5123	E5
2133	F10	6105	D4
2134	F9	6107	B10
2135	G11	6120	D10
2136	G10	7101	E9
2137	E11	7103	G9
2138	E10	7104	D5
2140	F10	7105	B6
2141	E10	7109	C6
2142	E10	7110	D11
2143	C10	7122	F7
2144	E10	7124	G6
2145	G11	9100	F4
2147	G11	9101	E7
2148	G11	9102	D10
2150	F8	9104	E6
2158	D9	9107	F11
2160	E9	9108	G11
2161	E9	9111	C4
2161	C11	9114	E5
3102	G6	9115	C8
3103	H6	9116	G8
3104	G6	9118	G10
3107	G7	9119	G7
3108	C6	9120	D10
3109	B7	9121	D9
3123	E4	9123	D9
3124	E5	9124	D8
3125	C7	9125	D8
3128	F6	9126	C8
3129	E6		
3130	E6		
3131	C6		
3132	E5		
3134	E5		
3137	G5		
3140	H8		
3141	G9		
3142	G10		
3143	G8		
3144	H8		
3145	F9		
3146	B10		
3150	C11		
3151	C10		
3152	G9		
3153	G9		
3154	C10		
3155	C10		
3158	G10		
3159	G11		
3160	G11		
3161	G11		
3162	E9		
3163	F8		
3164	C11		
3167	F8		
3169	D5		
3172	F7		
3173	F7		

TUNER 95
3104 217 04120/04340 bl. 110 - 01

LEU0119
9533

ADJUSTMENT TABLE

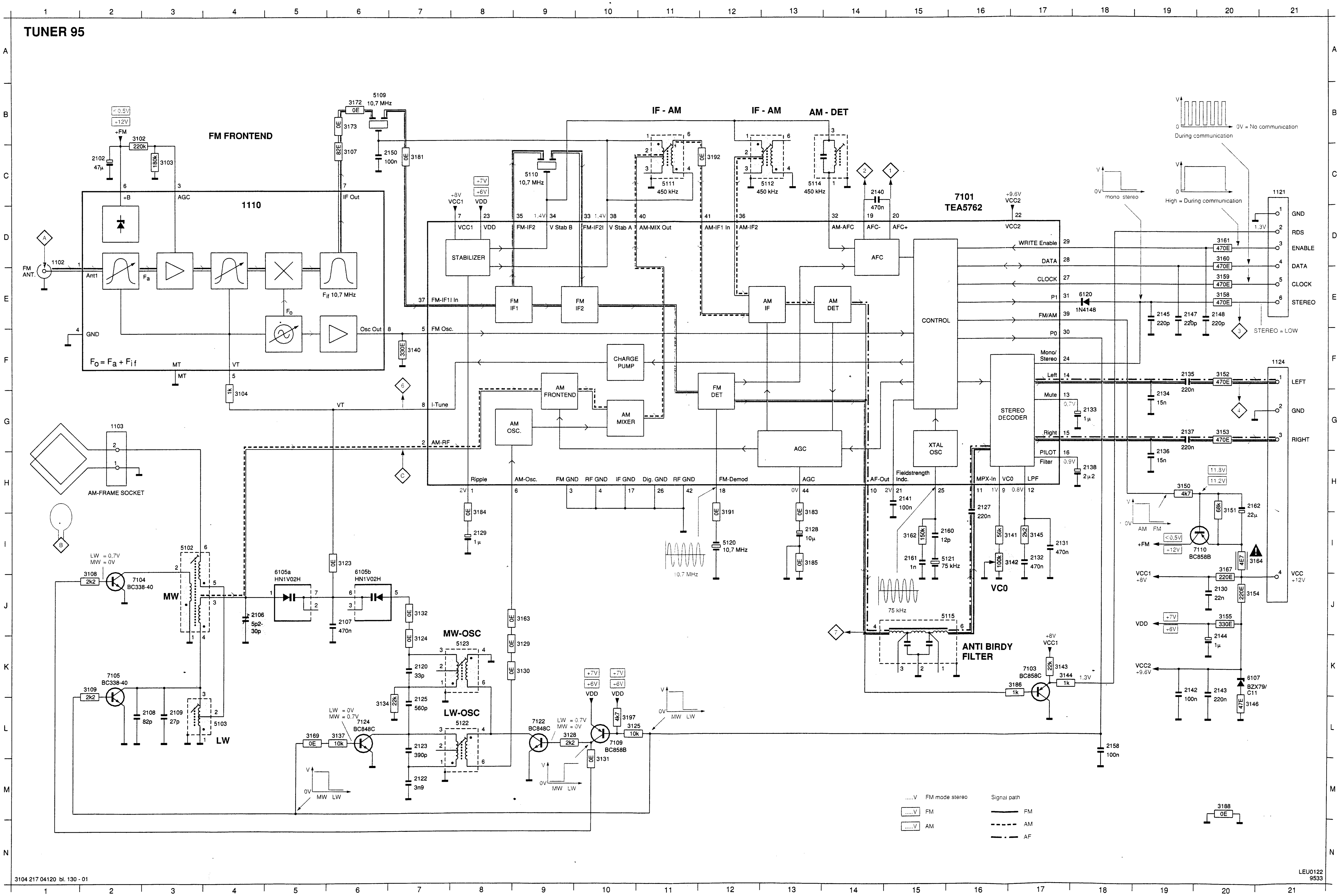
Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (50kHz grid)			108MHz	check	6	7...9V
			87.5MHz	check		1.3...2V
MW 531 - 1602kHz (9kHz grid)			1602kHz	5123		8.3V ±0.2V
			531kHz	check		1V ±0.4V
LW 153 - 279kHz (3kHz grid)			279kHz	5122		8.3V ±0.2V
			153kHz	check		1V ±0.4V
FM - VCO						
FM	98MHz 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz
DISTORTION						
FM	98MHz 1mV 90% L, 9% pilot mod=1kHz	A	98MHz	mixcoil inside tuner 1110	4	min. distortion
AM IF						
MW	450kHz Δf=10kHz as low as possible			5111 5112	7	symmetrical and max. height ↕
	450.0kHz continuous wave	C		5114	1 2	0mV ±2mV
AM RF						
MW	588kHz mod=1kHz, 30% AM	B*	558kHz	5102	7	MAX ↕
	1494kHz		1494kHz	2106		
LW	198kHz mod=1kHz, 30% AM		198kHz	5103		MAX

* Signal supplied via frame antenna

↕ Repeat

1102	D1	1124	F21	2108	L3	2123	L7	2129	I8	2133	G18	2137	G19	2142	K19	2147	E19	2160	I15	3103	C3	3109	K2	3128	L9	3132	J7	3141	I16	3145	I17	3152	F20	3158	E20	3162	I15	3169	L5	3183	I13	3188	M20	5102	I3	5111	C11	5120	I12	6105a	I5	7101	C16	7109	L10
1103	G2	2102	C2	2109	L3	2125	L7	2130	J20	2134	G19	2138	H18	2143	K20	2148	E20	2161	I15	3104	G4	3123	I6	3129	K9	3134	L6	3142	I16	3146	L20	3153	G20	3159	E20	3163	J9	3172	B6	3184	I8	3191	I12	5103	L4	5112	C12	5121	I15	6105b	I6	7103	K17	7110	I19
1110	D4	2106	J4	2120	K7	2127	H16	2131	I17	2135	F19	2140	C14	2144	K20	2150	C6	2162	H20	3107	C6	3124	K7	3130	K9	3137	L6	3143	K17	3150	H19	3154	J20	3160	D20	3164	I20	3173	B6	3185	I13	3192	C12	5109	B6	5114	C13	5122	L8	6107	K20	7104	J2	7122	L9
1121	C21	2107	J6	2122	M7	2128	I13	2132	I17	2136	H19	2141	H15	2145	E19	2158	L18	3102	B2	3108	J2	3125	L10	3131	M10	3140	F7	3144	K17	3151	I20	3155	J20	3161	D20	3167	I20	3181	C7	3186	K16	3197	L10	5110	C9	5115	J15	5123	K8	6120	E18	7105	K2	7124	L6

TUNER 95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16
17
18
19
20
21
A
B
C
D
E
F
G
H
I
J
K
L
M
N
FM FRONTEND
1110
<0.5V
+12V
+FM
3102
220k
2102
47µ
180k
3103
+B
AGC
IF Out
FM ANT.
1102
Ant1
Fa
Fif 10,7 MHz
Fo
Osc Out
GND
Fo = Fa + Fif
MT
VT
3104
1k
3172
0E
5109
10,7 MHz
3173
3107
82E
2150
100n
3181
3140
330E
VT
1103
AM-FRAME SOCKET
IF - AM
IF - AM
AM - DET
5110
10,7 MHz
5111
450 kHz
5112
450 kHz
5114
450 kHz
3192
2140
470n
7101
TEA5762
+8V
VCC1
+7V
+6V
VDD
+9.6V
VCC2
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
VCC2
STABILIZER
FM-IF1I In
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
FM Osc.
CHARGE PUMP
I-Tune
AM FRONTEND
AM MIXER
FM DET
AM OSC.
AM-RF
AGC
XTAL OSC
STEREO DECODER
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VCO
LPF
WRITE Enable
DATA
CLOCK
P1
FM/AM
P0
Mono/ Stereo
Left
Mute
Right
PILOT Filter
6120
1N4148
3184
2129
1µ
3191
5120
10,7 MHz
10,7 MHz
3183
2128
10µ
3185
2141
100n
3162
150k
2160
12p
2161
1n
5121
75 kHz
75 kHz
2127
220n
3141
56k
3142
100k
3145
2k2
2131
470n
2132
470n
VCO
2133
1µ
2138
2µ2
0V
mono stereo
During communication
0V = No communication
High = During communication
1121
GND
RDS
ENABLE
DATA
CLOCK
STEREO
1.3V
3161
470E
3160
470E
3159
470E
3158
470E
2145
220p
2147
220p
2148
220p
STEREO = LOW
1124
LEFT
GND
RIGHT
2135
220n
3152
470E
2134
15n
2137
220n
3153
470E
2136
15n
11.8V
11.2V
3150
4k7
3151
68k
2162
22µ
AM FM
+FM
<0.5V
+12V
7110
BC858B
3164
4E7
3167
220E
VCC1 +8V
VCC +12V
2130
22n
3154
220E
VDD
+7V
+6V
3155
330E
2144
1µ
VCC2 +9.6V
6107
BZX79/C11
2142
100n
2143
220n
3146
47E
7103
BC858C
3143
22k
3144
1k
3186
1k
1.3V
2158
100n
5115
ANTI BIRDY FILTER
5102
MW
LW = 0.7V
MW = 0V
3108
2k2
7104
BC338-40
2106
5p2-30p
6105a
HN1V02H
3123
6105b
HN1V02H
2107
470n
3132
3124
MW-OSC
5123
2120
33p
3134
22k
2125
560p
LW-OSC
5122
2123
390p
2122
3n9
3163
3129
3130
7105
BC338-40
3109
2k2
2108
82p
2109
27p
5103
LW
LW = 0V
MW = 0.7V
7124
BC848C
3169
0E
3137
10k
MW LW
7122
BC848C
LW = 0.7V
MW = 0V
3128
2k2
7109
BC858B
3197
4k7
3125
10k
3131
+7V
+6V
VDD
+7V
+6V
VDD
MW LW
MW LW
....V FM mode stereo
....V FM
....V AM
Signal path
FM
AM
AF
3188
0E

ELECTRICAL PARTSLIST TUNER 95 BOARD

MISCELLANEOUS

1102	4822 267 10283	SOCKET COAX IEC 75R
1103	4822 265 31184	JST CONNECTOR 2 POLE
1110	4822 210 10492	FRONTEND ASSY /02/08

DIODES

6105	4822 130 83075	HN1V02H
6107	4822 130 34488	BZX79-C11
6120	4822 130 30621	1N4148

TRANSISTORS

7103	4822 130 42513	BC858C
7104	5322 130 44779	BC338-40
7105	5322 130 44779	BC338-40
7109	5322 130 41983	BC858B
7110	5322 130 41983	BC858B
7122	5322 130 42136	BC848C
7124	5322 130 42136	BC848C

INTEGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1

COILS

5102	4822 157 71634	RF-COIL MW
5103	4822 157 71635	RF-COIL LW
5109	4822 157 71639	CER. FILTER 10,7MHz
5110	4822 242 70665	CER. FILTER 10,7MHZ
5111	4822 158 60511	AM-IF FILTER 450kHz
5112	4822 157 70302	AM-IF FILTER 450kHz
5114	4822 157 71637	AM-AFC FILTER 450KHZ
5115	4822 157 71636	ANTI-BIRDY FILTER
5120	4822 242 82065	CER. DISCRIMINATOR
5121	4822 242 81021	QUARTZ 75kHz
5122	4822 157 60517	RF-COIL AM
5123	4822 157 60517	RF-COIL AM

RESISTORS

3125	4822 116 83864	10k	5%	0,5W
3128	4822 116 52256	2k2	5%	0,16W
3142	4822 100 11163	TRIMPOT. 100K LIN.		
3154	4822 116 52215	220R	5%	0,16W
3155	4822 116 52219	330R	5%	0,5W
3158	4822 116 52224	470R	5%	0,5W
3159	4822 116 52224	470R	5%	0,5W
3160	4822 116 52224	470R	5%	0,5W
3161	4822 116 52224	470R	5%	0,5W
3164	4822 052 10478	4R7	5%	NFR
3167	4822 116 52215	220R	5%	0,16W

CHIP RESISTORS

3102	4822 051 20224	220k	5%	0,1W
3103	4822 051 20184	180k	5%	0,1W
3104	4822 051 10102	1k	2%	0,25W
3107	4822 051 20829	82R	5%	0,1W
3108	4822 051 20222	2k2	5%	0,1W
3109	4822 051 20222	2k2	5%	0,1W
3123	4822 051 10008	CHIP JUMPER 1206		
3124	4822 051 10008	CHIP JUMPER 1206		
3129	4822 051 20008	CHIP JUMPER 0805		
3130	4822 051 10008	CHIP JUMPER 1206		
3131	4822 051 10008	CHIP JUMPER 1206		
3132	4822 051 20008	CHIP JUMPER 0805		
3134	4822 051 20223	22k	5%	0,1W
3137	4822 051 20103	10k	5%	0,1W
3140	4822 051 20331	330R	5%	0,1W
3141	4822 051 20563	56k	5%	0,1W
3143	4822 051 20223	22k	5%	0,1W
3144	4822 051 10102	1k	2%	0,25W
3145	4822 051 20222	2k2	5%	0,1W
3146	4822 051 20479	47R	5%	0,1W
3150	4822 051 20472	4k7	5%	0,1W
3151	4822 051 20683	68k	5%	0,1W
3152	4822 051 20471	470R	5%	0,1W
3153	4822 051 20471	470R	5%	0,1W
3162	4822 051 20154	150k	5%	0,1W
3163	4822 051 10008	CHIP JUMPER 1206		
3169	4822 051 20008	CHIP JUMPER 0805		
3172	4822 051 10008	CHIP JUMPER 1206		
3173	4822 051 10008	CHIP JUMPER 1206		
3181	4822 051 10008	CHIP JUMPER 1206		
3183	4822 051 10008	CHIP JUMPER 1206		
3184	4822 051 10008	CHIP JUMPER 1206		
3185	4822 051 10008	CHIP JUMPER 1206		
3186	4822 051 10102	1k	2%	0,25W
3188	4822 051 10008	CHIP JUMPER 1206		
3191	4822 051 20008	CHIP JUMPER 0805		
3192	4822 051 20008	CHIP JUMPER 0805		
3197	4822 051 20472	4k7	5%	0,1W

CAPACITORS

2102	4822 124 40433	47µF	20%	25V
2106	4822 125 60102	30pF		VARIABLE
2107	4822 121 51252	470nF	5%	63V
2123	4822 121 51254	390pF	1%	400V
2125	4822 121 51381	560pF	1%	400V
2128	4822 124 41579	10µF	20%	50V
2129	4822 124 40242	1µF	20%	63V
2130	4822 126 11585	22nF	20%	50V
2133	4822 124 40242	1µF	20%	63V
2138	4822 124 41576	2,2µF	20%	50V
2140	4822 121 51252	470nF	5%	63V
2144	4822 124 40242	1µF	20%	63V
2162	4822 124 41596	22µF	20%	50V

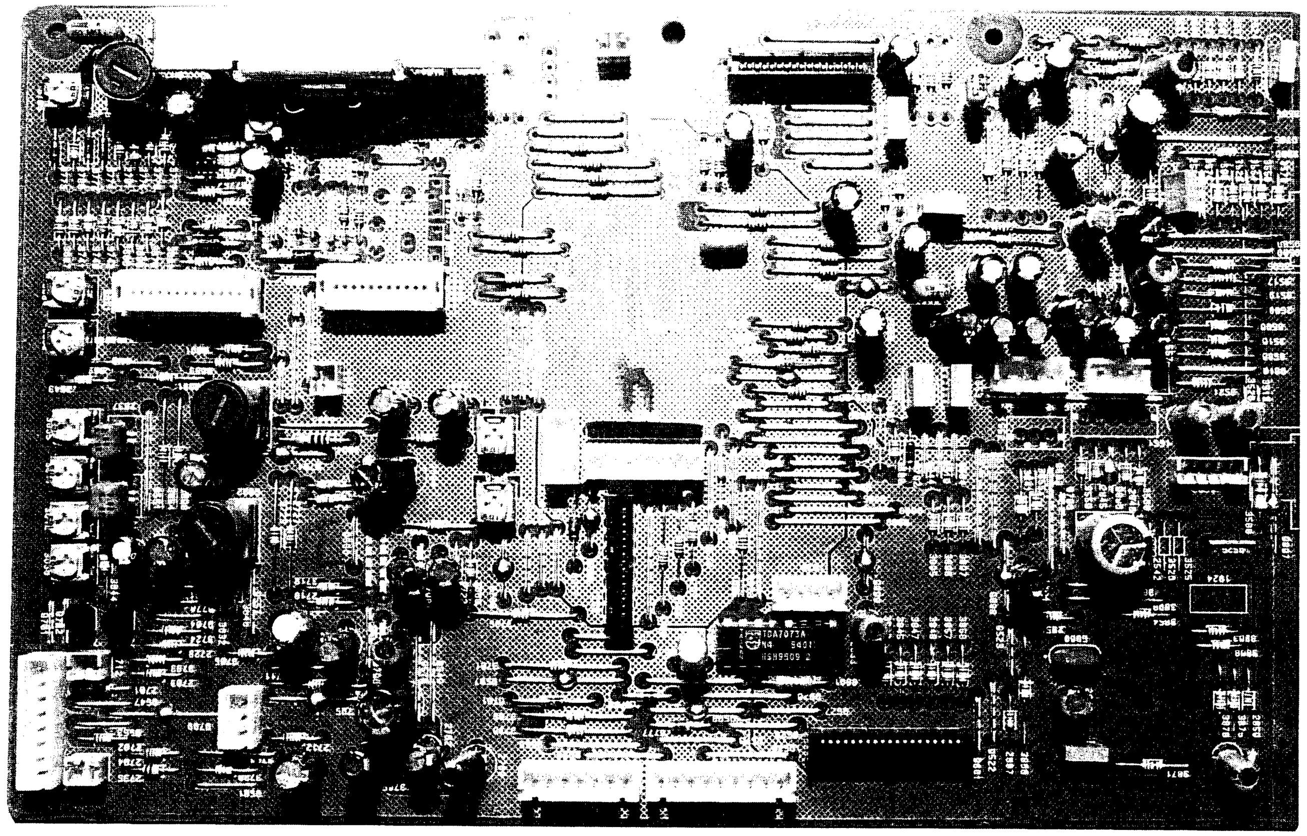
CHIP CAPACITORS

2108	4822 122 33515	82pF	5%	50V
2109	5322 122 31946	27pF	5%	50V
2120	5322 122 32659	33pF	5%	50V
2122	5322 126 10465	3,9nF	10%	63V
2127	4822 122 32927	220nF	10%	63V
2131	4822 122 33325	470nF	20%	50V
2132	4822 122 33325	470nF	20%	50V
2134	4822 122 33128	15nF	10%	63V
2135	4822 122 32927	220nF	10%	63V
2136	4822 122 33128	15nF	10%	63V
2137	4822 122 32927	220nF	10%	63V
2141	4822 122 31947	100nF	20%	50V
2142	4822 122 31947	100nF	20%	50V
2143	4822 122 32927	220nF	10%	63V
2145	4822 122 33575	220pF	5%	50V
2147	4822 122 33575	220pF	5%	50V

ELECTRICAL PARTSLIST TUNER 95 BOARD

CHIP CAPACITORS

2148	4822 122 33575	220pF	5%	50V
2150	4822 122 31947	100nF	20%	50V
2158	4822 122 31947	100nF	20%	50V
2160	4822 122 32139	12pF	5%	63V
2161	5322 122 34123	1nF	10%	50V



COMBI BOARD

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VALID FOR STAGE .5

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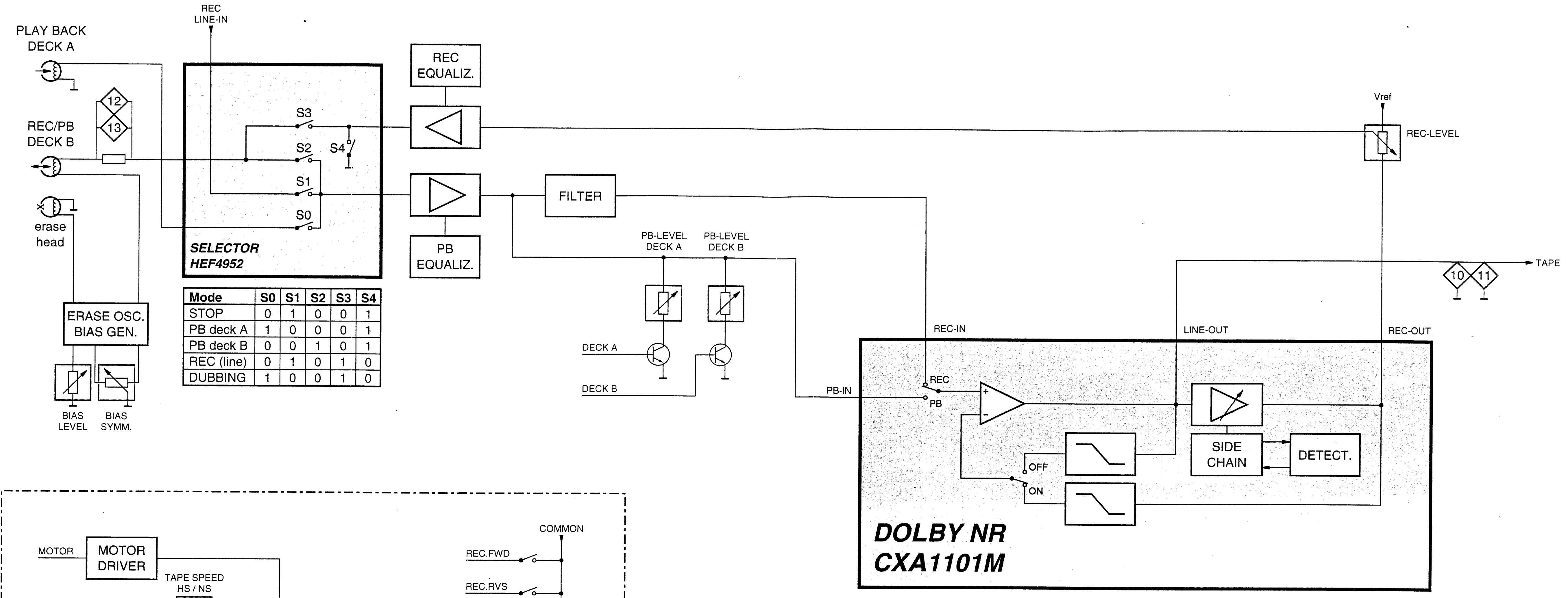
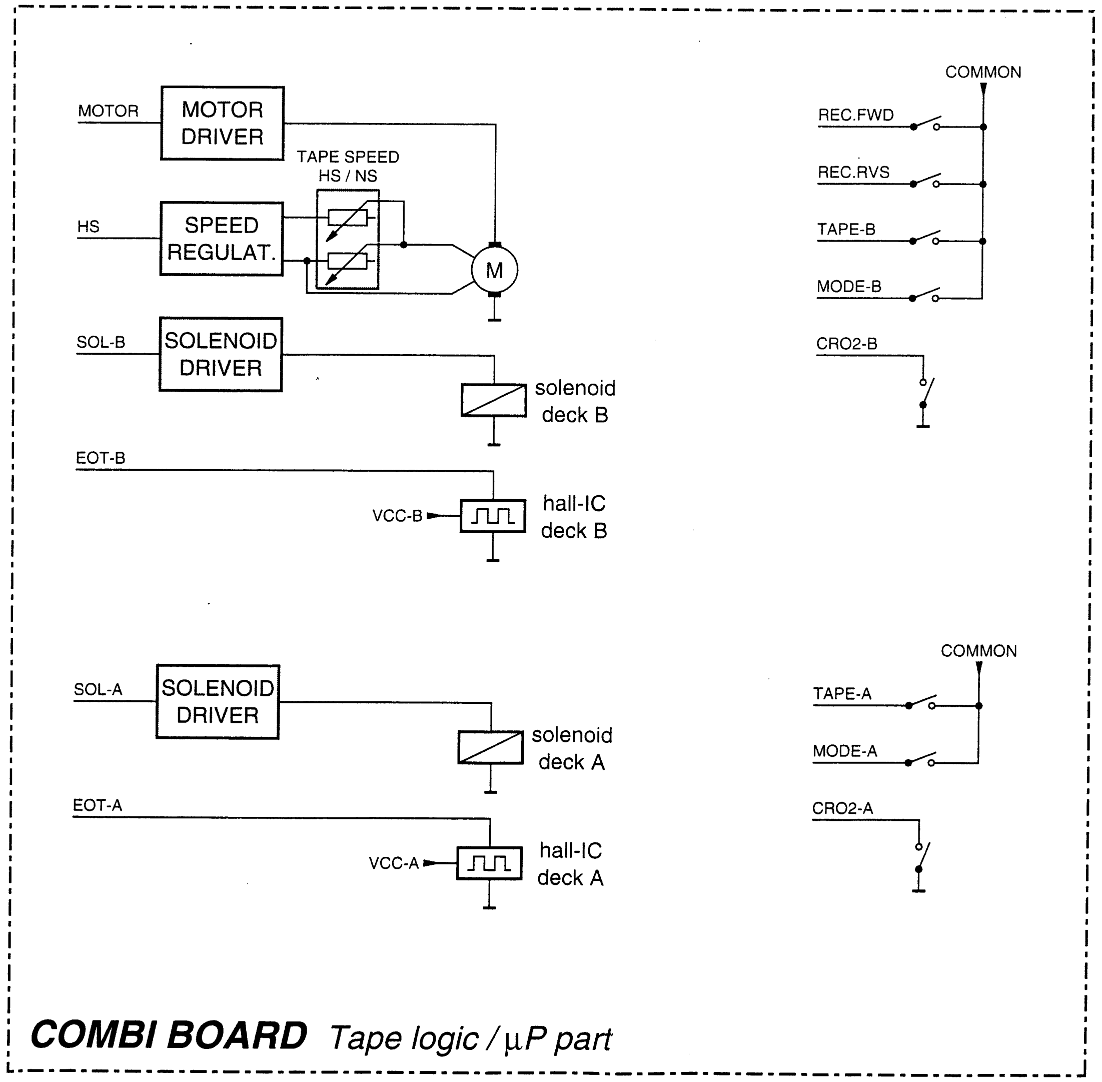
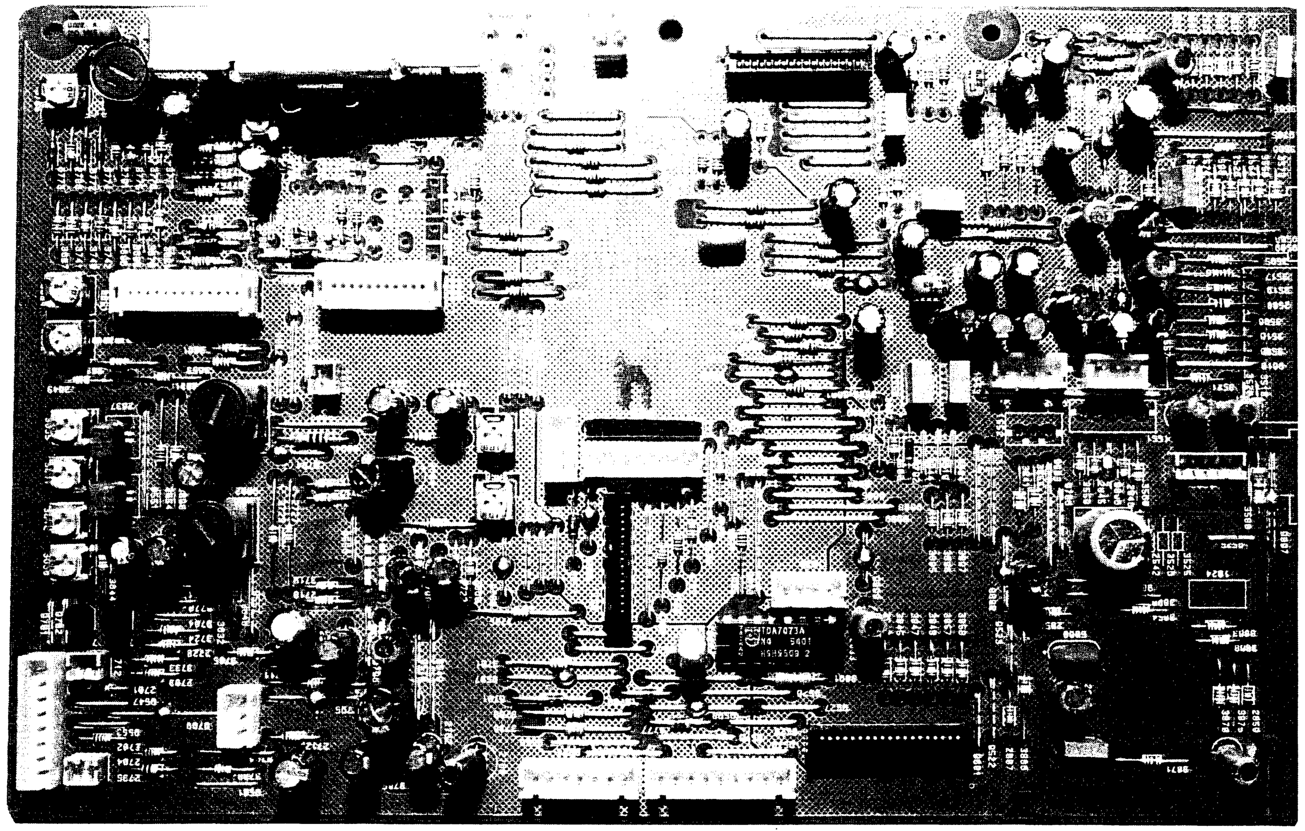
Remarks

FUNCTIONAL DIAGRAM TAPE PART


REC
LINE-IN
PLAY BACK
DECK A
REC/PB
DECK B
12
13
erase
head
S3
S2
S4
S1
S0
SELECTOR
HEF4952
REC
EQUALIZ.
PB
EQUALIZ.
FILTER
PB-LEVEL
DECK A
PB-LEVEL
DECK B
DECK A
DECK B
ERASE OSC.
BIAS GEN.
BIAS
LEVEL
BIAS
SYMM.
Vref
REC-LEVEL
TAPE
10
11
REC-IN
LINE-OUT
REC-OUT
PB-IN
REC
PB
OFF
ON
SIDE
CHAIN
DETECT.
DOLBY NR
CXA1101M

Mode	S0	S1	S2	S3	S4
STOP	0	1	0	0	1
PB deck A	1	0	0	0	1
PB deck B	0	0	1	0	1
REC (line)	0	1	0	1	0
DUBBING	1	0	0	1	0


MOTOR
MOTOR
DRIVER
TAPE SPEED
HS / NS
HS
SPEED
REGULAT.
M
SOL-B
SOLENOID
DRIVER
solenoid
deck B
EOT-B
VCC-B
hall-IC
deck B
SOL-A
SOLENOID
DRIVER
solenoid
deck A
EOT-A
VCC-A
hall-IC
deck A
COMMON
REC.FWD
REC.RVS
TAPE-B
MODE-B
CRO2-B
COMMON
TAPE-A
MODE-A
CRO2-A
COMBI BOARD Tape logic / µP part



COMBI BOARD

Layout stage .5

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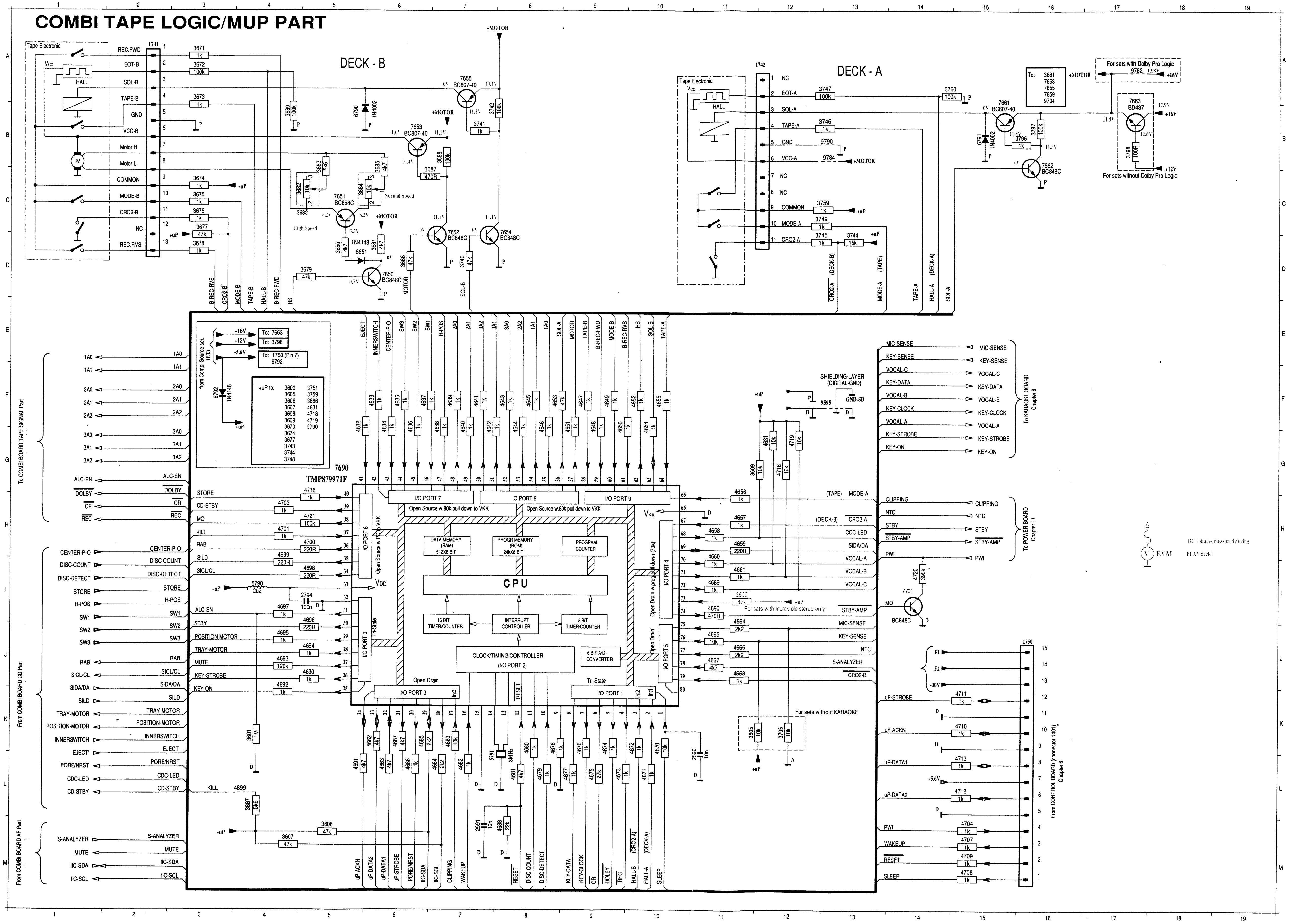
Remarks

COMBI TAPE LOGIC/MUP PART


DECK - B
DECK - A
Tape Electronic
HALL
REC.FWD
EOT-B
SOL-B
TAPE-B
GND
VCC-B
Motor H
Motor L
COMMON
MODE-B
CRO2-B
NC
REC.RVS
EOT-A
SOL-A
TAPE-A
VCC-A
MODE-A
CRO2-A
+MOTOR
High Speed
Normal Speed
For sets with Dolby Pro Logic
For sets without Dolby Pro Logic
7690
TMP879971F
I/O PORT 7
O PORT 8
I/O PORT 9
I/O PORT 6
I/O PORT 0
I/O PORT 3
I/O PORT 1
I/O PORT 4
I/O PORT 5
Open Source w.80k pull down to VKK
DATA MEMORY (RAM) 512X8 BIT
PROGR MEMORY (ROM) 24KX8 BIT
PROGRAM COUNTER
CPU
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
8 BIT A/D-CONVERTER
Open Drain
Tri-State
VKK
VDD
SHIELDING-LAYER (DIGITAL-GND)
For sets with incredible stereo only
For sets without KARAOKE
To COMBI BOARD TAPE SIGNAL Part
From COMBI BOARD CD Part
From COMBI BOARD AF Part
To KARAOKE BOARD Chapter 8
To POWER BOARD Chapter 11
From CONTROL BOARD (connector 1401) Chapter 6
DC voltages measured during PLAY deck 1
from Combi Source sel. 1833

1741	A 2
1742	A12
1750	J16
2590	L11
2591	M 7
2794	I 5
3600	I11
3601	K 4
3605	K11
3606	M 5
3607	M 4
3608	L11
3609	G11
3671	A 3
3672	A 3
3673	A 3
3674	C 3
3675	C 3
3676	C 3
3677	C 3
3678	D 3
3679	D 5
3680	D 5
3681	D 6
3682	C 4
3683	B 5
3684	C 5
3685	B 6
3687	C 6
3688	B 7
3689	B 4
3740	D 7
3741	B 7
3742	B 7
3744	D13
3745	D12
3746	B13
3747	A13
3748	A 8
3749	C12
3759	C13
3760	B14
3795	K12
3796	B15
3797	A16
3798	B17
3886	K 4
3887	L 4
4630	J 5
4631	G12
4632	F 5
4633	F 6
4634	F 6
4635	F 6
4636	F 6
4637	F 6
4638	F 7
4639	F 7
4640	F 7
4641	F 7
4642	F 7
4643	F 8
4644	F 8
4645	F 8
4646	F 8
4647	F 9
4648	F 9
4649	F 9
4650	F 9
4651	F 9
4652	F10
4653	F 8
4654	F10
4655	F10
4656	G11
4657	H11
4658	H11
4659	H11
4660	H11
4661	I11
4662	K 6
4663	L 6
4664	I11
4665	J11
4666	J11
4667	J11
4668	J11
4669	J11
4670	K10
4671	L10
4672	K10
4673	L 9
4674	K 9
4675	L 9
4676	K 9
4677	L 9
4678	K 8
4679	L 8
4680	K 8
4681	L 8
4682	L 7
4683	K 7
4684	L 7
4685	K 6
4686	L 6
4687	K 6
4688	M 8
4689	I11
4690	I11
4691	L 5
4692	J 4
4693	J 4
4694	J 5
4695	J 4
4696	I 5
4697	I 4
4698	I 5
4699	H 4
4700	H 5
4701	H 4
4703	H 4
4704	M15
4707	M15
4708	M15
4709	M15
4710	K15
4711	K15
4712	L15
4713	L15
4716	G 5
4718	G12
4719	G12
4720	I14
4721	H 5
5790	I 4
5791	L 7
6651	D 5
6790	B 5
6791	B15
6792	F 3
7650	D 6
7651	C 5
7652	D 7
7653	B 6
7654	D 8
7655	A 7
7661	A15
7662	B16
7663	A17
7690	G 5
7701	I14
9595	F13
9782	A17
9784	B13
9790	B14

2501 E 2	2584 C 2	2725 B 7	2861 B 2	3546 C 4	3609 E 6	3674 D 9	3722 B 8	3764 A 7	3861 A 4	4520 E 4	4557 E 6	4641 C 6	4678 D 5	4798 E 9	7631 C 9	7787 E 9	T023 B 2	T052 A 6	T083 E 6	T123 D 9	T165 A 9
2502 D 4	2585 D 2	2726 B 7	2862 A 3	3547 E 2	3619 B 1	3675 D 8	3724 B 8	3766 A 7	3862 A 3	4521 E 6	4559 E 6	4642 C 6	4681 D 5	4799 C 8	7632 B 9	7788 A 6	T024 B 5	T053 A 6	T084 E 5	T124 D 9	T166 B 9
2513 E 4	2586 D 2	2728 B 8	3500 C 3	3548 E 2	3620 B 1	3676 D 8	3725 B 8	3767 A 6	3864 A 3	4523 D 8	4565 E 4	4643 C 6	4682 D 5	4801 B 2	7633 C 9	7820 A 4	T025 B 5	T054 A 6	T085 E 6	T125 D 7	T167 A 8
2514 D 3	2590 E 6	2729 A 7	3501 E 2	3549 D 4	3623 E 2	3677 D 8	3726 B 7	3769 A 7	3865 B 3	4524 C 8	4566 B 3	4644 C 6	4683 D 5	4802 A 3	7634 B 9	7850 B 4	T026 B 4	T055 B 2	T086 E 5	T126 D 7	T168 A 8
2515 D 2	2591 D 5	2730 A 7	3502 D 4	3550 C 3	3625 E 2	3678 D 8	3727 A 7	3771 E 9	3867 B 3	4525 D 2	4568 A 7	4645 D 6	4687 D 5	4803.A 3	7640 C 7	7851 E 6	T027 A 4	T056 A 5	T087 E 6	T127 E 7	T169 A 8
2516 C 2	2631 C 9	2731 A 7	3504 D 3	3552 E 2	3626 E 2	3680 D 9	3728 A 7	3772 E 8	3869 A 4	4526 E 5	4572 C 6	4646 C 6	4688 D 5	4804 C 3	7650 D 9	7852 B 2	T028 B 3	T057 A 5	T088 E 4	T128 D 7	T170 E 8
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2524 E 2	2633 C 8	2737 A 8	3508 D 4	3555 E 1	3634 B 9	3685 D 9	3730 A 7	3778 E 9	3874 B 3	4529 B 9	4577 A 5	4648 C 6	4690 D 6	4899 C 4	7652 D 9	7856 B 3	T030 B 2	T060 B 1	T090 E 4	T130 D 7	T172 B 7
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2527 E 2	2636 B 8	2760 A 9	3513 D 2	3568 D 1	3640 B 9	3693 C 7	3734 A 8	3781 B 9	3878 B 4	4533 E 6	4580 D 4	4651 D 6	4696 D 5	6553 E 4	7655 D 9	T001 A 4	T033 C 6	T063 A 5	T093 E 1	T133 E 7	T175 C 8
2528 D 2	2639 C 7	2782 E 9	3514 C 2	3572 E 5	3644 B 9	3695 C 7	3737 A 9	3782 E 9	3879 A 3	4534 C 8	4581 E 3	4652 D 6	4697 C 5	6554 D 4	7656 E 7	T002 A 3	T034 C 5	T064 E 5	T094 E 1	T134 D 8	T176 C 9
2531 E 2	2640 B 7	2787 E 9	3515 D 2	3573 E 1	3645 C 8	3701 A 9	3739 A 7	3783 E 9	3880 A 5	4535 D 7	4592 B 6	4653 D 6	4698 C 5	7500 C 4	7657 D 7	T003 A 3	T035 C 5	T065 E 5	T095 C 1	T135 E 8	T177 B 5
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2540 D 4	2708 A 8	2840 A 5	3533 E 4	3592 D 2	3658 B 7	3711 A 8	3750 D 7	3844 B 3	4502 C 5	4545 B 1	4633 C 6	4665 E 6	4710 B 5	7509 C 1	7710 A 9	T011 A 4	T043 A 2	T073 B 2	T115 D 8	T146 B 6	
2553 D 4	2709 A 8	2841 A 3	3534 E 4	3597 E 2	3659 C 7	3712 A 8	3751 E 7	3849 A 3	4503 A 9	4546 B 6	4634 C 6	4666 D 6	4711 B 6	7512 C 4	7720 A 8	T012 A 4	T045 C 2	T074 C 3	T116 D 9	T147 D 5	
2559 E 3	2710 A 8	2847 A 3	3537 D 4	3598 D 2	3661 C 7	3713 B 8	3752 E 7	3851 B 2	4506 C 8	4547 B 7	4635 C 6	4667 E 6	4712 B 5	7513 E 1	7730 B 8	T013 A 4	T046 C 2	T076 C 3	T117 C 9	T148 E 5	
2573 C 2	2719 C 8	2850 A 3	3538 D 4	3599 B 2	3662 B 7	3714 A 7	3756 D 7	3852 B 3	4510 B 1	4548 C 2	4636 C 6	4669 E 6	4713 B 5	7514 E 2	7740 A 7	T014 B 3	T047 A 6	T078 A 5	T118 D 9	T149 E 7	
2574 C 2	2720 B 8	2851 A 3	3539 D 4	3605 E 5	3665 C 7	3716 A 8	3758 E 7	3853 B 2	4511 E 8	4549 B 3	4637 C 6	4670 E 6	4716 C 6	7515 E 2	7780 E 9	T015 A 5	T048 B 6	T079 C 3	T119 D 9	T161 B 9	
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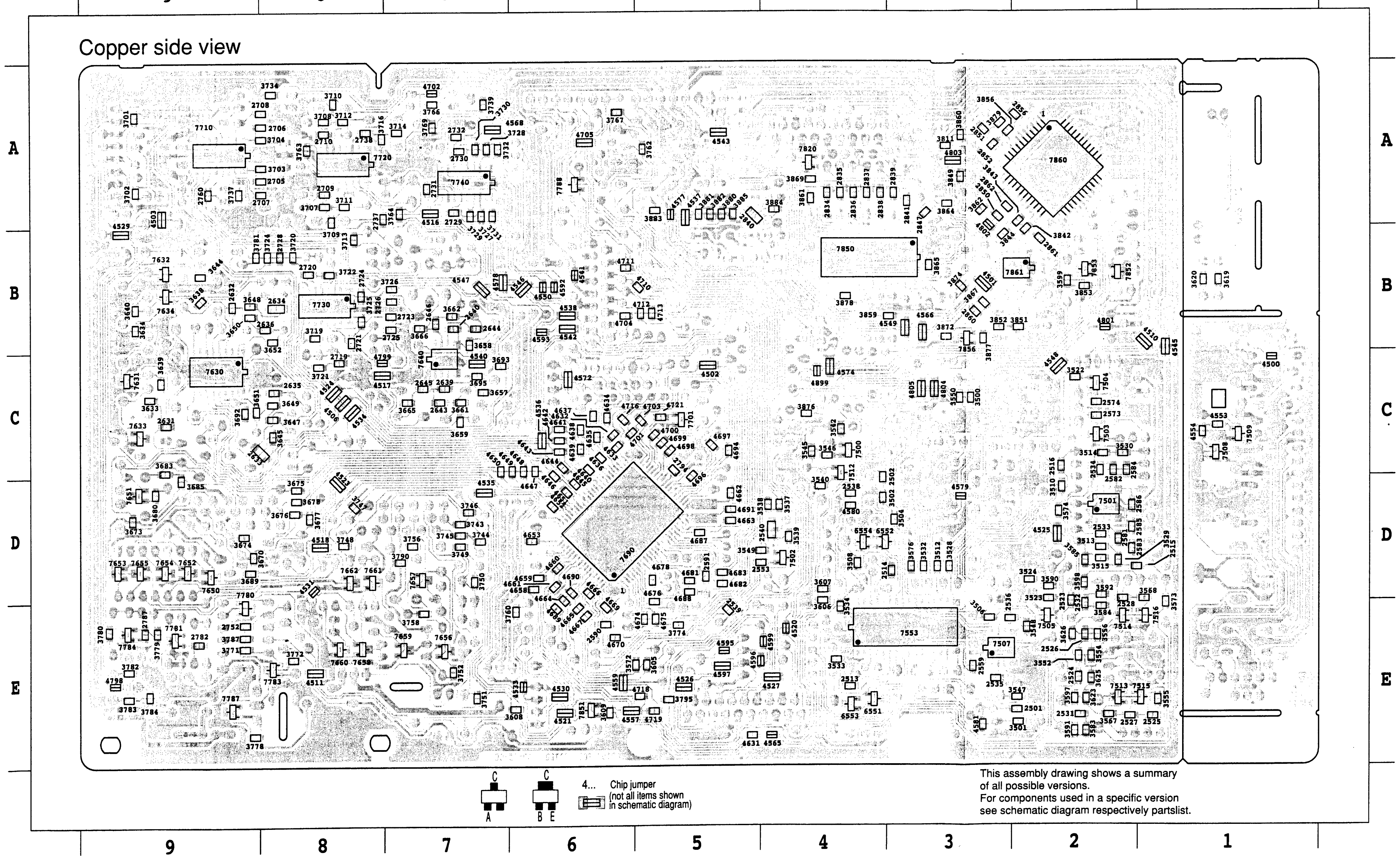
2582 C 2	2723 B 7	2856 A 2	3542 C 4	3607 D 4	3670 D 9	3720 B 8	3762 A 5	3859 B 3	4517 C 8	4553 C 1	4639 C 6	4675 E 5	4719 E 5	7553 E 3	7783 E 8	T018 A 3	T050 B 3	T081 C 2	T121 D 9	T163 A 9	
2583 D 2	2724 B 8	2860 B 3	3545 C 4	3608 E 6	3673 D 9	3721 C 8	3763 A 8	3860 A 3	4518 D 8	4554 C 1	4640 C 6	4676 E 5	4721 C 5	7630 C 9	7784 E 9	T019 A 4	T051 A 5	T082 C 2	T122 D 9	T164 A 9	

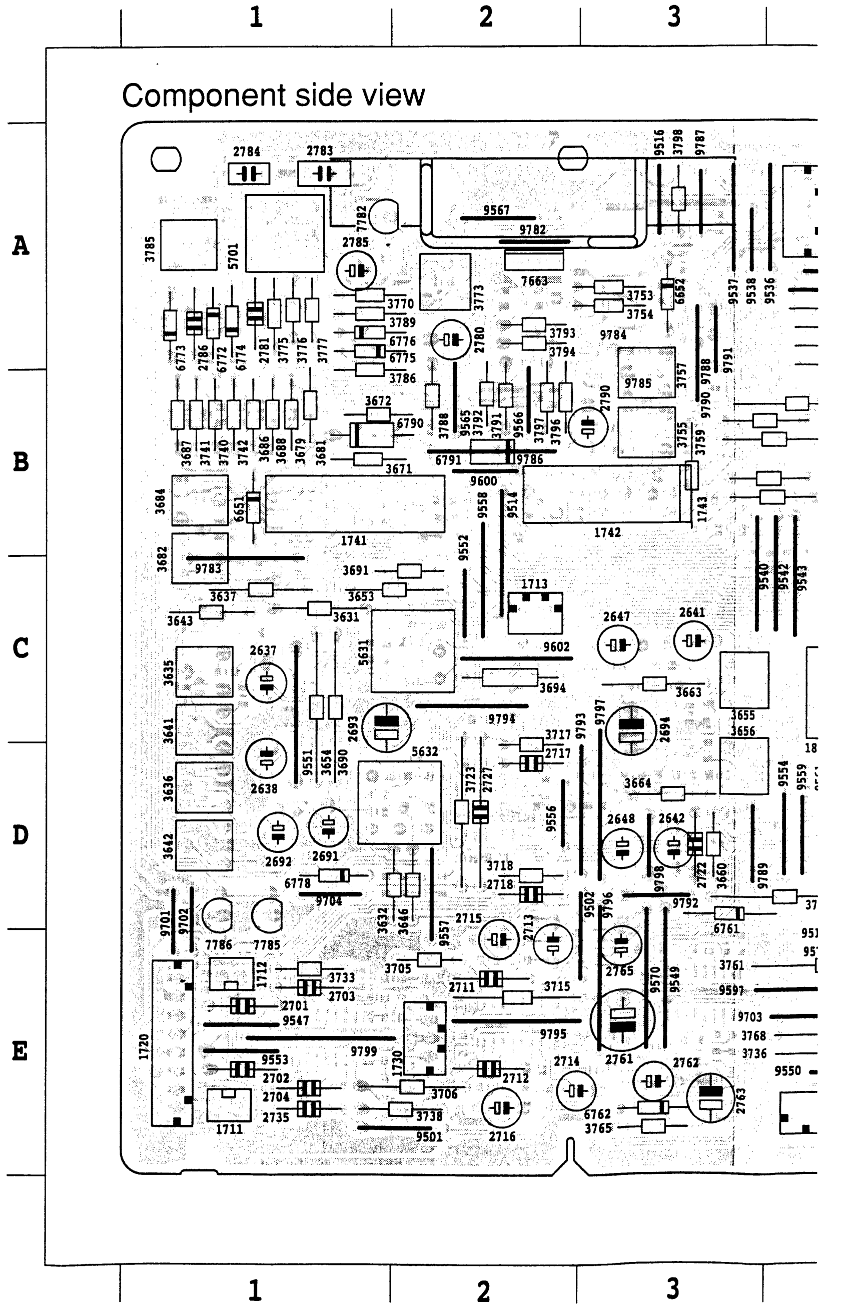
Copper side view



This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

0002 A 9	1720 E 1	2503 A 7	2544 A 8	2589 D 8	2716 E 2	2831 D 7	3518 C 9	3562 C
0003 D 9	1730 E 2	2504 B 7	2550 B 6	2637 C 1	2717 D 2	2832 D 8	3519 B 8	3563 B
0004 A 9	1740 A 4	2505 A 7	2552 B 8	2638 D 1	2718 D 2	2833 D 6	3520 C 8	3564 B
0007 E 9	1741 B 1	2506 B 6	2555 C 7	2641 C 3	2722 D 3	2842 D 8	3521 C 8	3565 A
1504 D 9	1742 B 3	2507 A 7	2556 C 6	2642 D 3	2727 D 2	2843 B 7	3525 D 8	3566 A
1505 C 8	1743 B 3	2508 B 6	2557 B 8	2647 C 3	2733 B 6	2844 B 7	3526 D 8	3569 B
1552 C 8	1750 D 4	2509 A 9	2558 B 7	2648 D 3	2734 A 5	2845 C 7	3527 A 7	3570 B
1553 C 7	1820 D 8	2511 A 6	2560 B 7	2691 D 1	2735 E 1	2846 C 8	3531 A 7	3575 A
1554 C 9	1824 D 8	2512 B 6	2561 A 7	2692 D 1	2761 E 3	2848 E 8	3535 B 6	3577 A
1555 C 9	1825 E 6	2517 A 6	2563 B 9	2693 C 1	2762 E 3	2849 E 7	3536 A 6	3578 B
1556 B 9	1826 E 6	2518 B 6	2564 B 9	2694 C 3	2763 E 3	2855 E 5	3541 A 8	3580 E
1557 C 8	1828 D 5	2519 C 8	2565 A 9	2701 E 1	2765 E 3	2858 D 7	3543 A 6	3586 C
1558 B 9	1829 E 4	2520 C 8	2566 A 9	2702 E 1	2780 A 2	2859 E 8	3544 B 7	3587 C
1559 C 8	1830 A 5	2521 A 8	2575 C 9	2703 E 1	2781 A 1	3503 A 8	3551 A 8	3588 C
1560 B 9	1831 C 4	2529 A 8	2576 C 9	2704 E 1	2783 A 1	3505 A 7	3553 A 9	3589 A
1561 C 7	1832 C 4	2530 B 8	2577 A 9	2711 E 2	2784 A 1	3507 A 6	3557 A 8	3593 A
1562 A 4	1833 E 5	2537 A 8	2578 A 9	2712 E 2	2785 A 1	3509 A 9	3558 A 8	3594 A
1711 E 1	1834 A 5	2541 B 8	2579 B 7	2713 E 2	2786 A 1	3511 A 7	3559 C 7	3595 B
1712 E 1	1835 A 5	2542 D 8	2580 B 7	2714 E 2	2790 B 3	3516 B 8	3560 C 8	3596 B
1713 C 2	2500 C 6	2543 A 8	2588 B 8	2715 E 2	2807 E 7	3517 B 8	3561 C 9	3600 B

Component side view



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4803 A 3	7640 C 7	7851 E 6	T027 A 4	T056 A 5	T087 E 6	T127 E 7	T169 A 8
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4805 C 3	7651 D 9	7853 B 2	T029 B 2	T059 A 5	T089 E 6	T129 E 7	T171 A 7
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7500 C 4	7657 D 7	T003 A 3	T035 C 5	T065 E 5	T095 C 1	T135 E 8	T177 B 5
7501 D 2	7658 E 8	T004 A 4	T036 C 5	T066 D 3	T096 C 1	T139 B 6	
7502 D 4	7659 E 7	T005 A 3	T037 C 5	T067 E 3	T097 D 1	T140 B 6	
7503 C 2	7660 E 8	T006 A 4	T038 C 6	T068 E 5	T098 D 1	T141 B 6	
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7509 C 1	7710 A 9	T011 A 4	T043 A 2	T073 B 2	T115 D 8	T146 B 6	
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7553 E 3	7783 E 8	T018 A 3	T050 B 3	T081 C 2	T121 D 9	T163 A 9	
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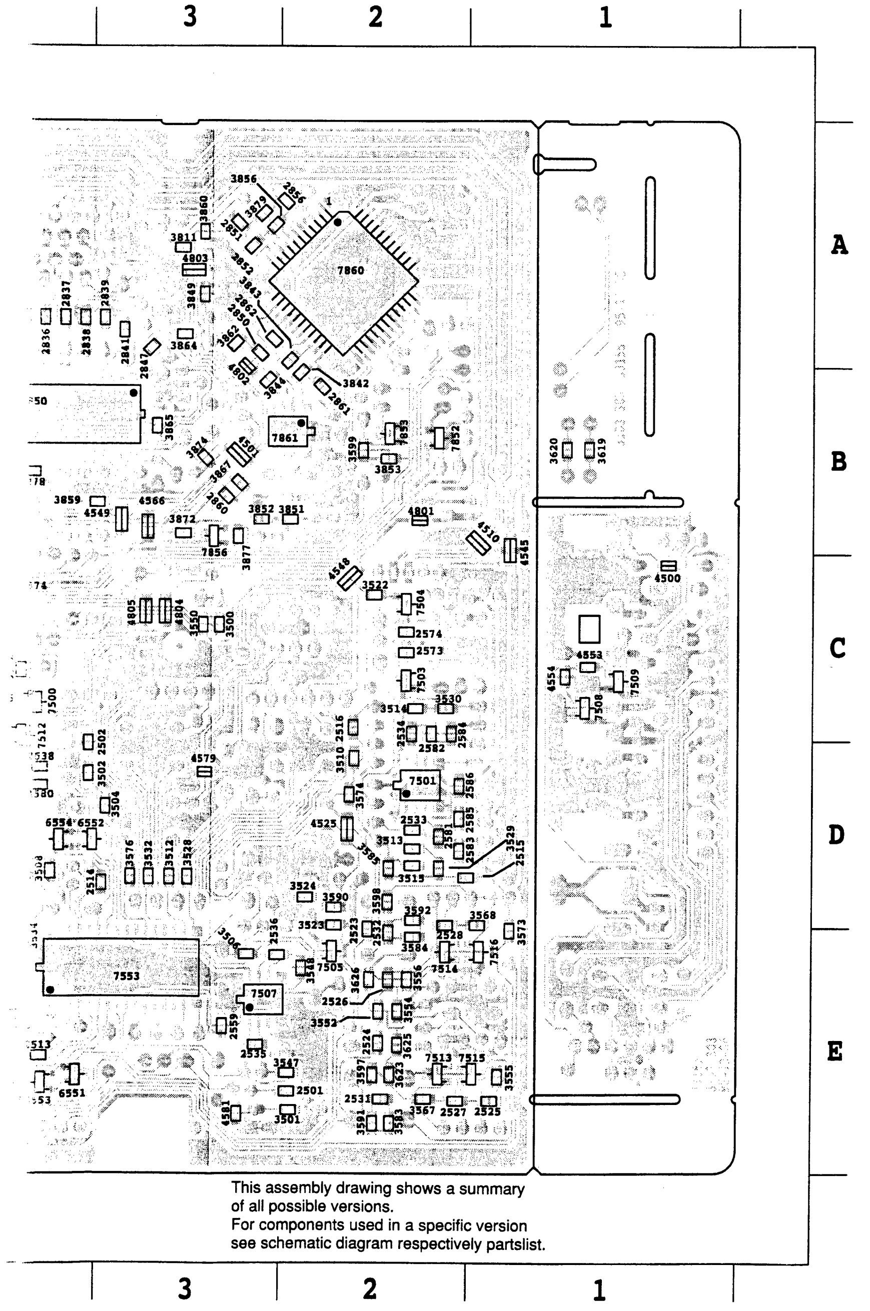
3
2
1
A
B
C
D
E
7860
7861
7501
7507
7553
7504
7508
7509
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6554
4801
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4500
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4525
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3514
3530
3590
3524
3523
2574
2573
2582
2533
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2501
3501
3555
3567
2527
2525

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of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

0002 A 9	1720 E 1	2503 A 7	2544 A 8	2589 D 8	2716 E 2	2831 D 7	3518 C 9	3562 C 9	3601 C 5	3671 B 1	3736 E 4	3788 B 2	3868 D 8	4657 B 4	5632 D 2	6791 B 2	9514 B 2	9540 C 3	9564 A 6	9602 C 2	9785 B 3
0003 D 9	1730 E 2	2504 B 7	2550 B 6	2637 C 1	2717 D 2	2832 D 8	3519 B 8	3563 B 9	3621 A 8	3672 B 1	3738 E 2	3789 A 1	3870 E 8	4668 A 4	5701 A 1	6792 C 6	9516 A 3	9541 B 7	9565 B 2	9603 C 6	9786 B 2
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0007 E 9	1741 B 1	2506 B 6	2555 C 7	2641 C 3	2722 D 3	2842 D 8	3521 C 8	3565 A 9	3624 A 9	3681 B 1	3741 B 1	3792 B 2	3873 C 4	4672 A 4	5791 B 5	7663 A 2	9518 C 6	9543 C 4	9567 A 2	9605 D 6	9788 A 3
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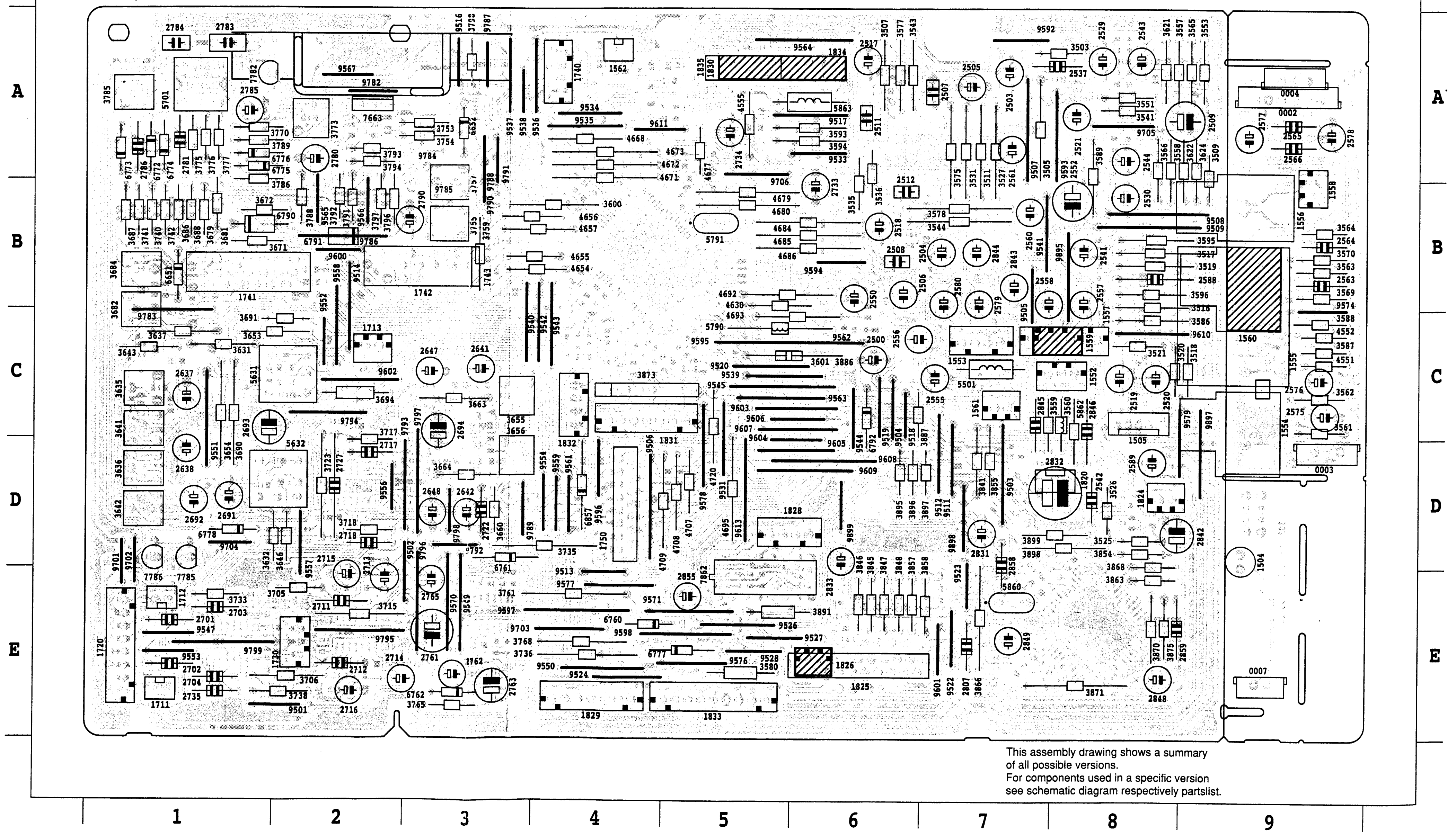
Component side view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This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

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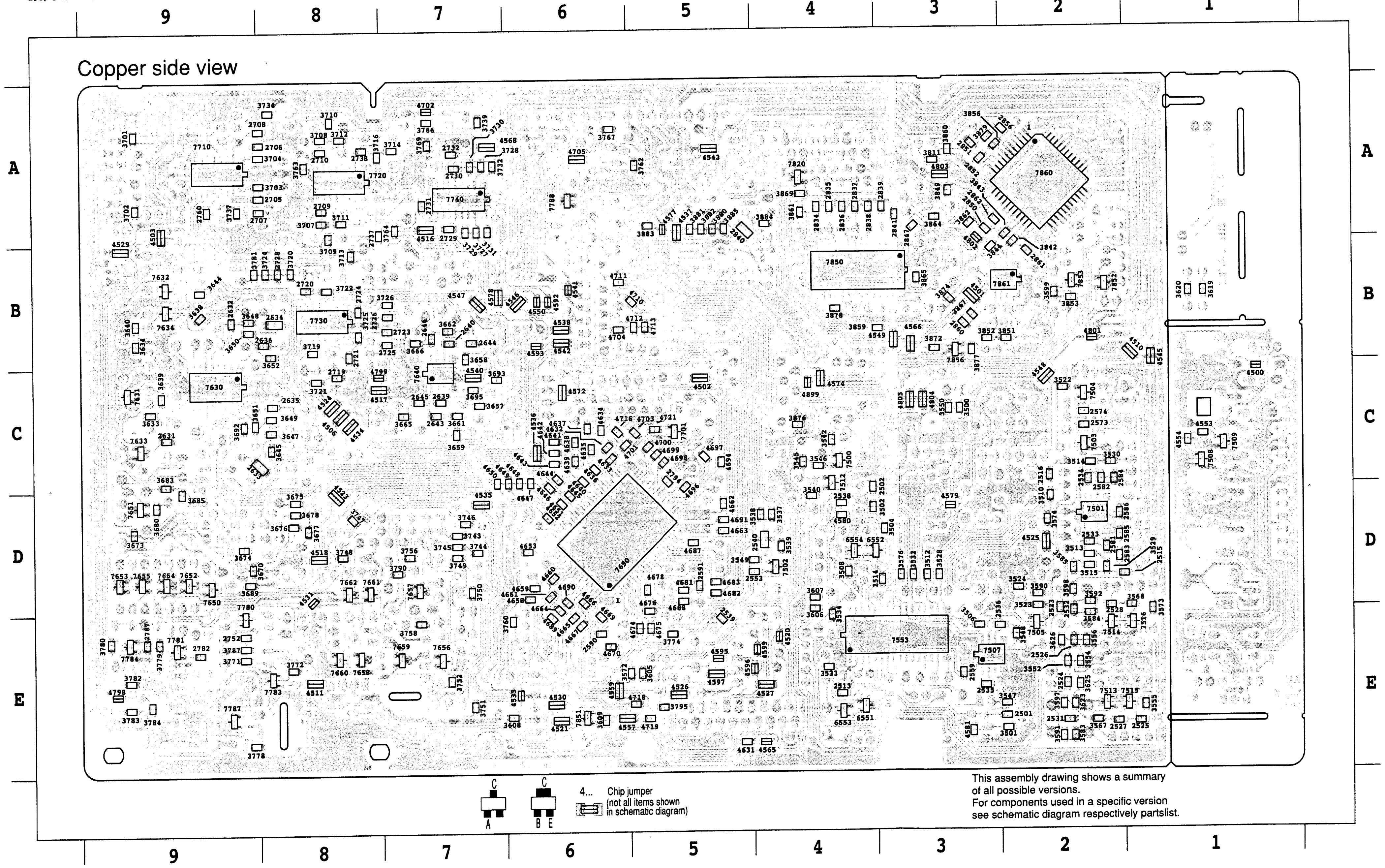

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

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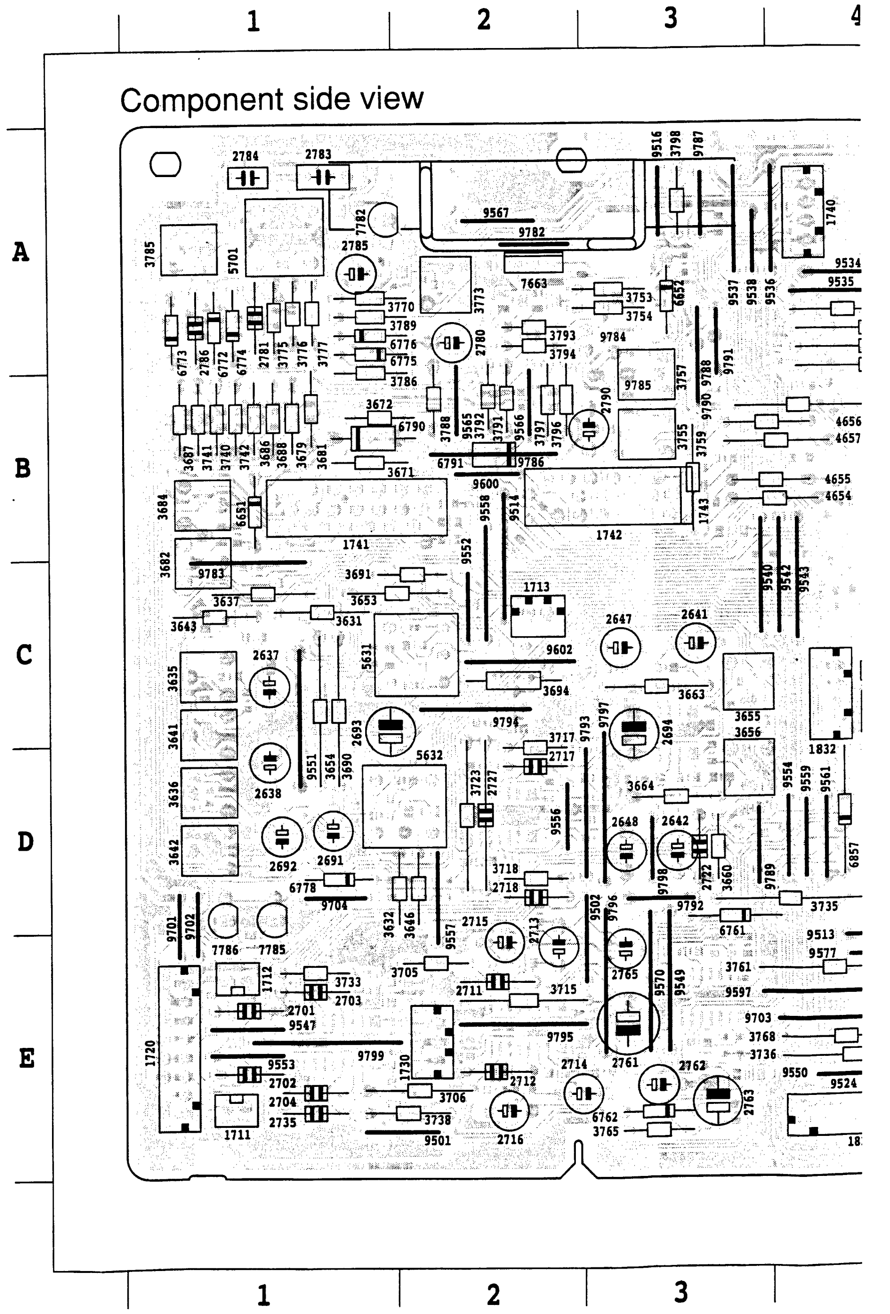

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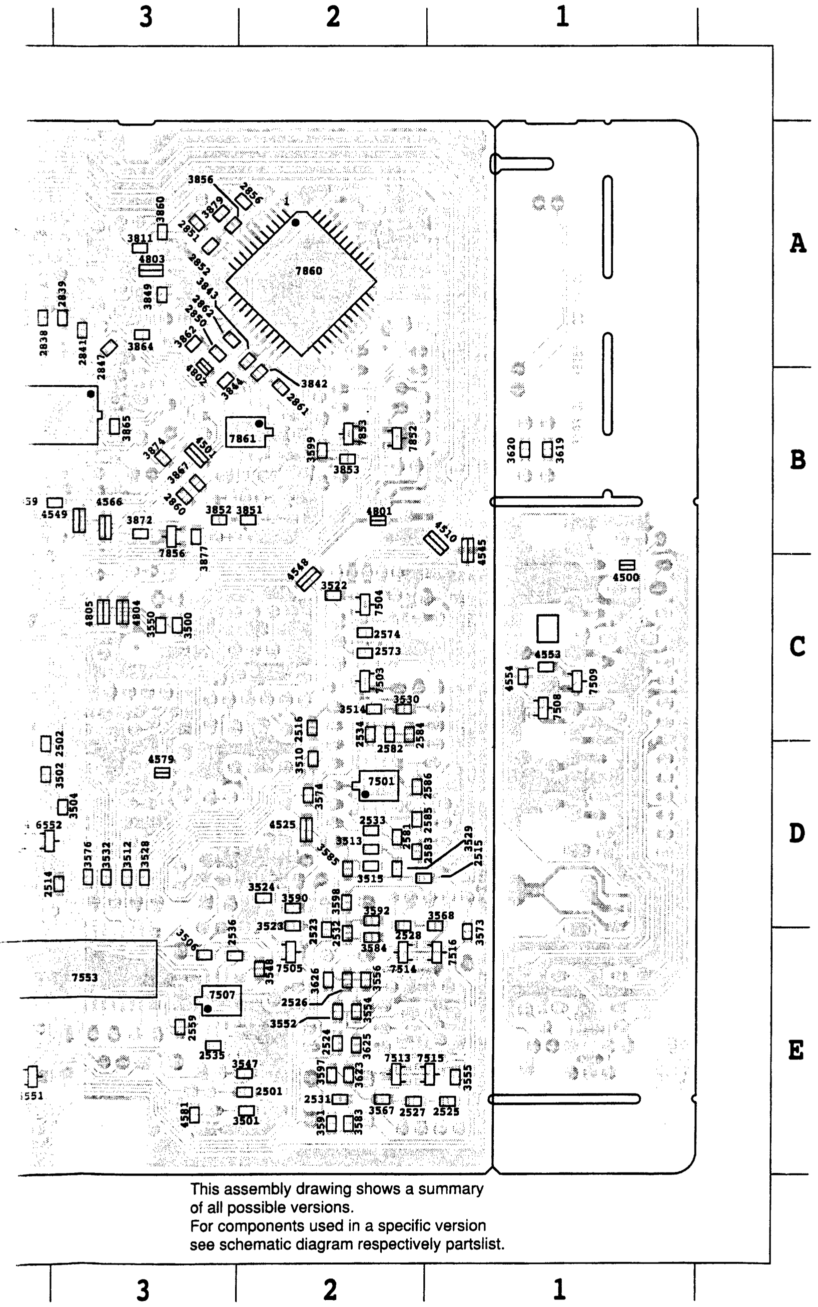
509 C 1	7710 A 9	T011 A 4	T043 A 2	T073 B 2	T115 D 8	T146 B 6	
512 C 4	7720 A 8	T012 A 4	T045 C 2	T074 C 3	T116 D 9	T147 D 5	
513 E 1	7730 B 8	T013 A 4	T046 C 2	T076 C 3	T117 C 9	T148 E 5	
514 E 2	7740 A 7	T014 B 3	T047 A 6	T078 A 5	T118 D 9	T149 E 7	
515 E 2	7780 E 9	T015 A 5	T048 B 6	T079 C 3	T119 D 9	T161 B 9	
516 E 1	7781 E 9	T016 A 5	T049 A 3	T080 D 3	T120 D 9	T162 E 9	
553 E 3	7783 E 8	T018 A 3	T050 B 3	T081 C 2	T121 D 9	T163 A 9	
7630 C 9	7784 E 9	T019 A 4	T051 A 5	T082 C 2	T122 D 9	T164 A 9	



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For components used in a specific version
see schematic diagram respectively partslist.

0002 A 9	1720 E 1	2503 A 7	2544 A 8	2589 D 8	2716 E 2	2831 D 7	3518 C 9	3562 C 9	3601 C 5	3671 B 1
0003 D 9	1730 E 2	2504 B 7	2550 B 6	2637 C 1	2717 D 2	2832 D 8	3519 B 8	3563 B 9	3621 A 8	3672 B 1
0004 A 9	1740 A 4	2505 A 7	2552 B 8	2638 D 1	2718 D 2	2833 D 6	3520 C 8	3564 B 9	3622 A 9	3679 B 1
0007 E 9	1741 B 1	2506 B 6	2555 C 7	2641 C 3	2722 D 3	2842 D 8	3521 C 8	3565 A 9	3624 A 9	3681 B 1
1504 D 9	1742 B 3	2507 A 7	2556 C 6	2642 D 3	2727 D 2	2843 B 7	3525 D 8	3566 A 8	3631 C 1	3682 C 1
1505 C 8	1743 B 3	2508 B 6	2557 B 8	2647 C 3	2733 B 6	2844 B 7	3526 D 8	3569 B 9	3632 D 2	3684 B 1
1552 C 8	1750 D 4	2509 A 9	2558 B 7	2648 D 3	2734 A 5	2845 C 7	3527 A 7	3570 B 9	3635 C 1	3686 B 1
1553 C 7	1820 D 8	2511 A 6	2560 B 7	2691 D 1	2735 E 1	2846 C 8	3531 A 7	3575 A 7	3636 D 1	3687 B 1
1554 C 9	1824 D 8	2512 B 6	2561 A 7	2692 D 1	2761 E 3	2848 E 8	3535 B 6	3577 A 6	3637 C 1	3688 B 1
1555 C 9	1825 E 6	2517 A 6	2563 B 9	2693 C 1	2762 E 3	2849 E 7	3536 A 6	3578 B 7	3641 C 1	3690 C 1
1556 B 9	1826 E 6	2518 B 6	2564 B 9	2694 C 3	2763 E 3	2855 E 5	3541 A 8	3580 E 5	3642 D 1	3691 C 2
1557 C 8	1828 D 5	2519 C 8	2565 A 9	2701 E 1	2765 E 3	2858 D 7	3543 A 6	3586 C 8	3643 C 1	3694 C 2
1558 B 9	1829 E 4	2520 C 8	2566 A 9	2702 E 1	2780 A 2	2859 E 8	3544 B 7	3587 C 9	3646 D 2	3705 E 2
1559 C 8	1830 A 5	2521 A 8	2575 C 9	2703 E 1	2781 A 1	3503 A 8	3551 A 8	3588 C 9	3653 C 2	3706 E 2
1560 B 9	1831 C 4	2529 A 8	2576 C 9	2704 E 1	2783 A 1	3505 A 7	3553 A 9	3589 A 8	3654 C 1	3715 E 2
1561 C 7	1832 C 4	2530 B 8	2577 A 9	2711 E 2	2784 A 1	3507 A 6	3557 A 8	3593 A 6	3655 C 3	3717 D 2
1562 A 4	1833 E 5	2537 A 8	2578 A 9	2712 E 2	2785 A 1	3509 A 9	3558 A 8	3594 A 6	3656 D 3	3718 D 2
1711 E 1	1834 A 5	2541 B 8	2579 B 7	2713 E 2	2786 A 1	3511 A 7	3559 C 7	3595 B 8	3660 D 3	3723 D 2
1712 E 1	1835 A 5	2542 D 8	2580 B 7	2714 E 2	2790 B 3	3516 B 8	3560 C 8	3596 B 8	3663 C 3	3733 E 1
1713 C 2	2500 C 6	2543 A 8	2588 B 8	2715 E 2	2807 E 7	3517 B 8	3561 C 9	3600 B 4	3664 D 3	3735 D 4

3736 E 4	3788 B 2	3868 D 8	4657 B 4	5632 D 2	6791 B 2	9514 B 2	9540 C 3	9564 A 6	9602 C 2	9785 B 3
3738 E 2	3789 A 1	3870 E 8	4668 A 4	5701 A 1	6792 C 6	9516 A 3	9541 B 7	9565 B 2	9603 C 6	9786 B 2
3740 B 1	3791 B 2	3871 E 8	4671 A 4	5790 C 5	6857 D 4	9517 A 6	9542 C 4	9566 B 2	9604 D 6	9787 A 3
3741 B 1	3792 B 2	3873 C 4	4672 A 4	5791 B 5	7663 A 2	9518 C 6	9543 C 4	9567 A 2	9605 D 6	9788 A 3
3742 B 1	3793 A 2	3875 E 8	4673 A 4	5860 E 7	7782 A 1	9519 C 6	9544 C 6	9570 E 3	9606 C 6	9789 D 3
3753 A 3	3794 A 2	3886 C 6	4677 A 5	5862 C 8	7785 D 1	9520 C 5	9545 C 5	9571 E 5	9607 C 6	9790 A 3
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3755 B 3	3797 B 2	3891 E 5	4680 B 5	6651 B 1	7862 E 5	9523 E 7	9549 E 3	9576 E 5	9609 D 6	9792 D 3
3757 B 3	3798 A 3	3895 D 6	4684 B 6	6652 A 3	9501 E 2	9524 E 4	9550 E 4	9577 E 4	9610 C 8	9793 D 3
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3761 E 4	3845 E 6	3897 D 7	4686 B 6	6761 D 3	9503 D 7	9527 E 5	9552 C 2	9579 D 9	9613 D 5	9795 E 2
3765 E 3	3846 E 6	3898 D 8	4692 B 5	6762 E 3	9504 C 6	9528 E 5	9553 E 1	9592 A 7	9701 D 1	9796 E 3
3768 E 4	3847 E 6	3899 D 8	4693 C 6	6772 A 1	9505 B 7	9531 D 5	9554 D 4	9593 A 8	9702 D 1	9797 D 3
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3776 A 1	3857 E 6	4630 B 5	4709 D 5	6776 A 1	9509 B 8	9536 A 4	9559 D 4	9597 E 4	9706 A 5	9897 D 9
3777 A 1	3858 E 7	4654 B 4	4720 C 5	6777 E 5	9511 D 7	9537 A 3	9561 D 4	9598 E 5	9782 A 2	9898 D 7
3785 A 1	3863 E 8	4655 B 4	5501 C 7	6778 D 1	9512 D 7	9538 A 3	9562 C 6	9600 B 2	9783 C 1	9899 D 6
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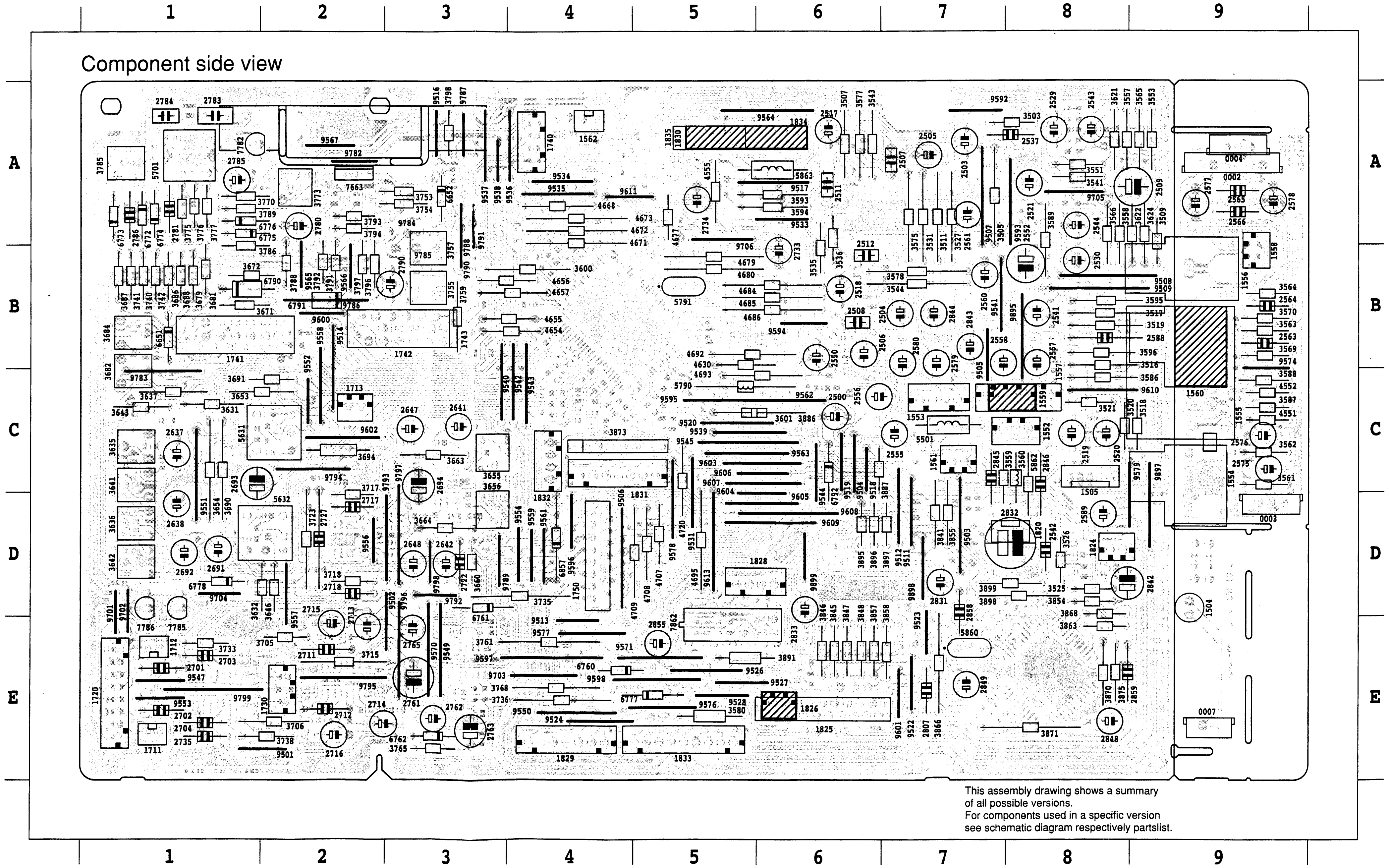
Component side view



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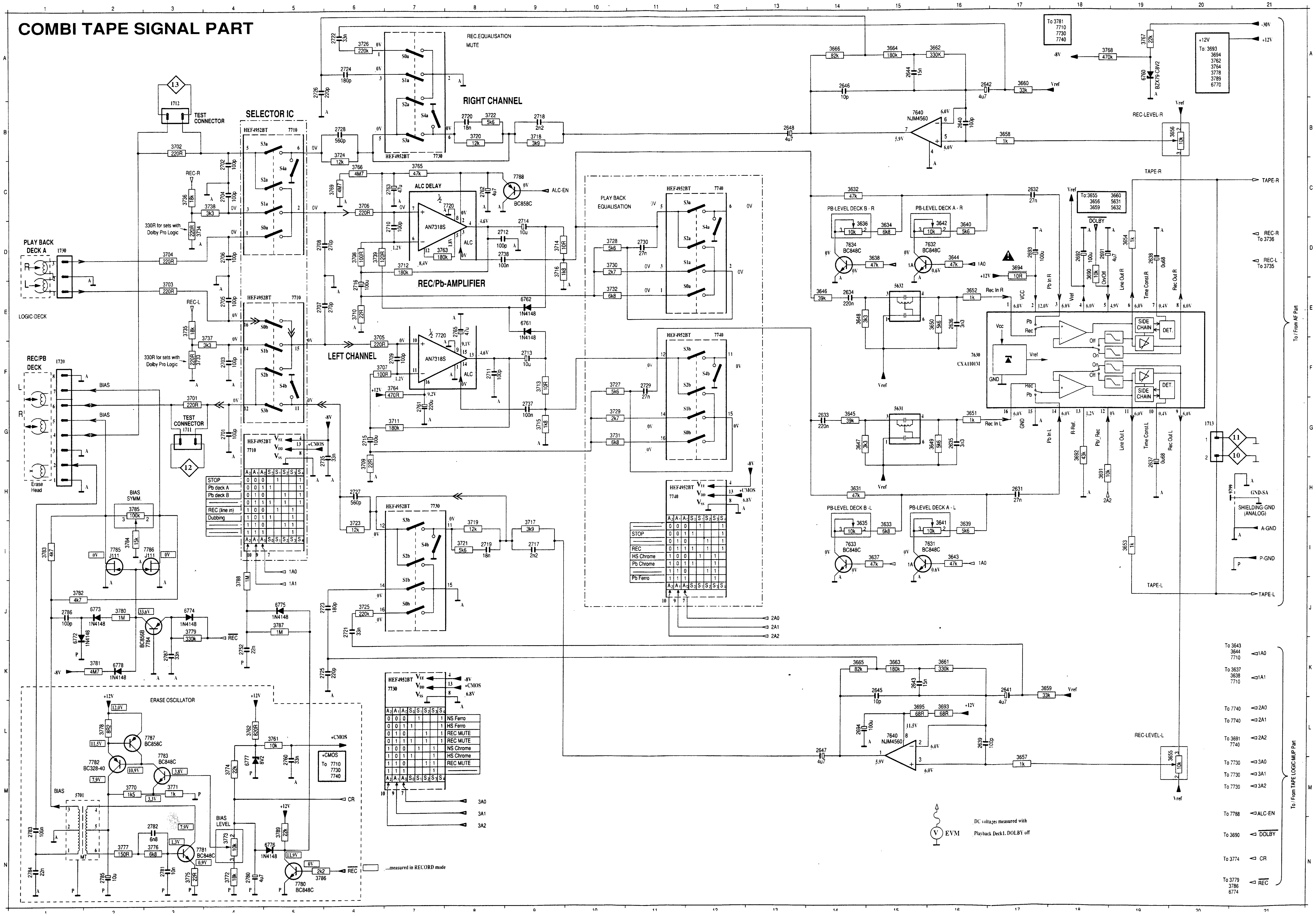
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

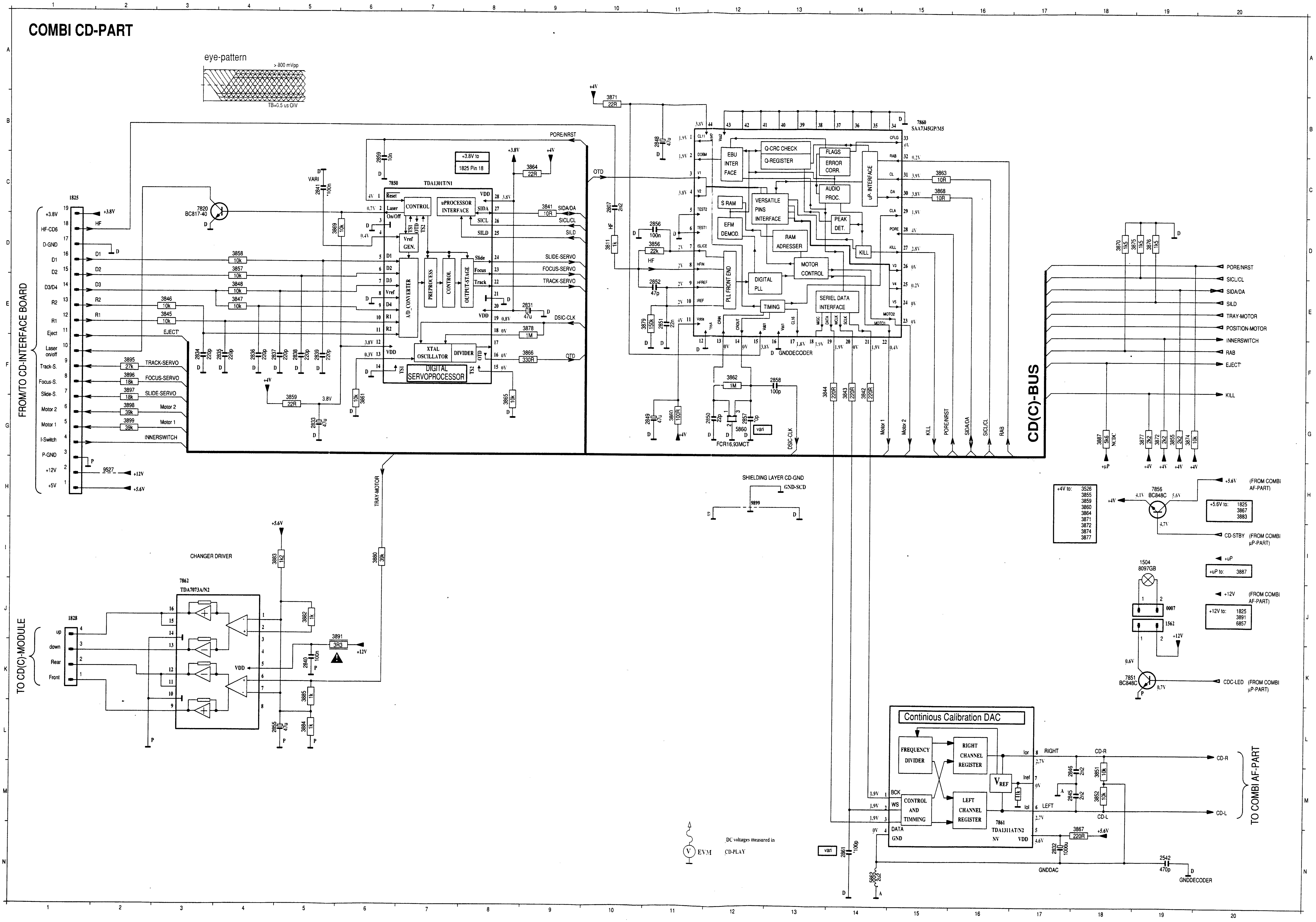
1711 G 3	2632 C17	2638 D19	2644 A15	2692 D18	2704 C 4	2710 D 7	2716 E 6	2722 A 6	2728 B 6	2752 K 4	2780 N 4	2786 J 1	3635 I14	3641 I16	3647 G14	3653 I19	3659 K17	3665 K14	3694 D17	3705 E 6	3711 G 7	3717 I 9	3723 I 6	3729 G10	3735 E 3	3762 L 4	3768 A18	3774 M 4	3780 J 2	3786 N 5	5701 M 1	6774 J 3	7631 I16	7710 B 5	7730 H 7	7781 N 4	7787 L 2
1712 B 3	2633 G14	2639 L16	2645 K15	2693 D17	2705 E 4	2711 F 8	2717 I 9	2723 J 5	2729 F11	2760 M 5	2781 N 3	2787 K 3	3636 D14	3642 D16	3648 E14	3654 D19	3660 A17	3666 A14	3695 L15	3706 C 6	3712 D 7	3718 B 9	3724 B 6	3730 D10	3736 C 3	3763 D 7	3769 C 6	3775 N 3	3781 K 2	3787 J 5	6760 A19	6775 J 5	7632 D16	7710 E 5	7730 K 7	7782 L 2	7788 C 9
1713 G20	2634 E14	2640 B16	2646 A14	2694 L14	2706 D 4	2712 D 8	2718 B 9	2724 A 6	2730 D11	2761 G 7	2782 N 3	3631 H14	3637 I15	3643 I16	3649 G16	3655 L19	3661 K16	3690 D18	3701 F 3	3707 F 6	3713 F 9	3719 I 8	3725 J 6	3731 G10	3737 E 4	3764 F 7	3770 M 2	3776 N 3	3782 J 1	3788 J 4	6761 E 9	6776 N 5	7633 I14	7710 G 4	7740 C12	7783 L 3	
1720 F 1	2635 G16	2641 K17	2647 L14	2701 G 4	2707 E 5	2713 F 9	2719 I 8	2725 K 5	2735 H 5	2762 C 8	2783 N 1	3632 C14	3638 D15	3644 D16	3650 E16	3656 B19	3662 A16	3691 H18	3702 B 3	3708 D 6	3714 D 9	3720 B 8	3726 A 6	3732 E10	3738 C 4	3765 C 7	3771 M 3	3777 N 2	3783 I 1	3789 N 5	6762 E 9	6777 M 4	7634 D14	7720 C 7	7740 E12	7784 K 3	
1730 D 1	2636 E16	2642 A16	2648 B13	2702 C 4	2708 D 5	2714 D 9	2720 B 8	2726 A 5	2737 G 9	2763 C 6	2784 N 1	3633 I15	3639 I16	3645 G14	3651 G16	3657 M17	3663 K15	3692 G18	3703 E 3	3709 H 6	3715 G 9	3721 I 8	3727 F10	3733 F 3	3739 D 6	3766 C 6	3772 N 4	3778 L 2	3784 I 2	5631 G15	6772 J 1	6778 K 2	7640 L15	7720 E 7	7740 H11	7785 I 2	
2631 H17	2637 H19	2643 K15	2691 D18	2703 F 4	2709 F 7	2715 G 6	2721 J 6	2727 H 6	2738 D 8	2765 E 8	2785 N 2	3634 D15	3640 D16	3646 E14	3652 E16	3658 B17	3664 A15	3693 L16	3704 D 3	3710 E 6	3716 D 9	3722 B 8	3728 D10	3734 D 3	3761 L 5	3767 A19	3773 N 4	3779 J 3	3785 H 2	5632 E15	6773 J 2	7630 F16	7640 B15	7730 B 7	7780 N 5	7786 I 2	

COMBI TAPE SIGNAL PART



SELECTOR IC
HEF4952BT 7710
RIGHT CHANNEL
LEFT CHANNEL
REC.EQUALISATION
MUTE
HEF4952BT 7730
ALC DELAY
AN7318S
7720
REC/Pb-AMPLIFIER
ALC
ALC-EN
BC858C
7788
PLAY BACK EQUALISATION
HEF4952BT 7740
TEST CONNECTOR
1712
1711
PLAY BACK DECK A
1730
LOGIC-DECK
REC/PB DECK
1720
BIAS
Erase Head
330R for sets with Dolby Pro Logic
REC-R
REC-L
BIAS SYMM.
3785 100k
7785 J111
7786 J111
ERASE OSCILLATOR
7787 BC858C
7782 BC328-40
7783 BC848C
7781 BC848C
7780 BC848C
BIAS LEVEL
5701
MT
+CMOS To 7710 7730 7740
CR
REC
1A0
1A1
2A0
2A1
2A2
3A0
3A1
3A2
STOP
Pb deck A
Pb deck B
REC (line in)
Dubbing
REC
HS Chrome
Pb Chrome
Pb Ferro
NS Ferro
HS Ferro
REC MUTE
NS Chrome
HS Chrome
To 3781 7710 7730 7740
-30V
+12V
-8V
+12V To: 3693 3694 3762 3764 3778 3789 6770
BZX79-C8V2
6760
7640 NJM4560
REC-LEVEL-R
REC-LEVEL-L
TAPE-R
TAPE-L
PB-LEVEL DECK B - R
PB-LEVEL DECK A - R
PB-LEVEL DECK B - L
PB-LEVEL DECK A - L
7634 BC848C
7632 BC848C
7633 BC848C
7631 BC848C
5632
5631
7630 CXA1101M
SIDE CHAIN
DET.
DOLBY
To:3655 3660 3656 5631 3659 5632
Rec In R
Rec In L
VCC
Pb In R
Pb In L
Line Out R
Line Out L
Time Const R
Time Const L
Rec Out R
Rec Out L
R-Ref.
On/Off
Pb_Rec
GND
Vref
1713
GND-SA
SHIELDING GND (ANALOG)
A-GND
P-GND
REC-R To 3736
REC-L To 3735
To / From AF Part
To 3643 3644 7710
To 3637 3638 7710
To 7740
To 3691 7740
To 7730
To 7788 ALC-EN
To 3690 DOLBY
To 3774 CR
To 3779 3786 6774 REC
To / From TAPE LOGIC MUP Part
DC voltages measured with Playback Deck1, DOLBY off
EVM
....measured in RECORD mode

COMBI CD-PART


eye-pattern
> 800 mVpp
TB=0.5 us DIV
FROM/TO CD-INTERFACE BOARD
1825
+3.8V
HF-CD6
D-GND
D1
D2
D3/D4
R2
R1
Eject
Laser on/off
Track-S.
Focus-S.
Slide-S.
Motor 2
Motor 1
I-Switch
P-GND
+12V
+5V
7820
BC817-40
7850
TDA1301T/N1
+3.8V to
1825 Pin 18
CONTROL
uPROCESSOR INTERFACE
Vref GEN.
A/D_CONVERTER
PREPROCESS
CONTROL
OUTPUT-STAGE
XTAL OSCILLATOR
DIVIDER
DIGITAL SERVOPROCESSOR
PORE/NRST
SIDA/DA
SICL/CL
SILD
SLIDE-SERVO
FOCUS-SERVO
TRACK-SERVO
DSIC-CLK
OTD
TRACK-SERVO
FOCUS-SERVO
SLIDE-SERVO
INNERSWITCH
EJECT'
TRAY-MOTOR
7860
SAA7345GP/M5
EBU INTER FACE
Q-CRC CHECK
Q-REGISTER
FLAGS
ERROR CORR.
AUDIO PROC.
uP- INTERFACE
S RAM
VERSATILE PINS INTERFACE
EFM DEMOD.
RAM ADRESSER
PEAK DET.
KILL
MOTOR CONTROL
PLL FRONT END
DIGITAL PLL
TIMING
SERIEL DATA INTERFACE
GNDDECODER
5860
FCR16.93MCT
DSIC-CLK
Motor 1
Motor 2
KILL
PORE/NRST
SIDA/DA
SICL/CL
RAB
CD(C)-BUS
PORE/NRST
SICL/CL
SIDA/DA
SILD
TRAY-MOTOR
POSITION-MOTOR
INNERSWITCH
RAB
EJECT'
KILL
SHIELDING LAYER CD-GND
GND-SCD
9899
+4V to: 3526 3855 3859 3860 3864 3871 3872 3874 3877
7856
BC848C
+5.6V (FROM COMBI AF-PART)
+5.6V to: 1825 3867 3883
CD-STBY (FROM COMBI µP-PART)
1504
8097GB
+µP
+uP to: 3887
+12V (FROM COMBI AF-PART)
+12V to: 1825 3891 6857
0007
1562
7851
BC848C
CDC-LED (FROM COMBI µP-PART)
CHANGER DRIVER
7862
TDA7073A/N2
1828
TO CD(C)-MODULE
up
down
Rear
Front
3891
3R3
+12V
Continious Calibration DAC
FREQUENCY DIVIDER
RIGHT CHANNEL REGISTER
CONTROL AND TIMMING
LEFT CHANNEL REGISTER
VREF
7861
TDA1311AT/N2
BCK
WS
DATA
GND
RIGHT
LEFT
CD-R
CD-L
GNDDAC
2542
470p
GNDDECODER
TO COMBI AF-PART
EVM
DC voltages measured in CD-PLAY

0007	J19
1504	I19
1562	J19
1825	C 1
1826	H 1
1828	J 1
1831	A17
1832	D17
2542	N19
2807	C10
2831	E 9
2832	N17
2833	G 5
2834	F 3
2835	F 4
2836	F 4
2837	F 4
2838	F 5
2839	F 5
2840	K 5
2841	C 5
2845	M18
2846	M18
2848	B11
2849	G11
2850	G12
2851	E11
2852	E11
2855	L 5
2856	D11
2857	G12
2858	F13
2859	C 6
2861	N14
3811	D10
3841	C 9
3842	F14
3843	F14
3844	F13
3845	E 3
3846	E 3
3847	E 4
3848	E 4
3851	M18
3852	M18
3855	G19
3856	D11
3857	D 4
3858	D 4
3859	G 5
3860	G11
3861	G 6
3862	F12
3863	C15
3864	C 9
3865	G 8
3866	F 9
3867	N18
3868	C15
3869	D 5
3870	D18
3871	B10
3872	G19
3873	A18
3874	G19
3875	D18
3876	D19
3877	G19
3878	E 9
3879	E10
3880	I 6
3881	I 5
3882	J 5
3883	I 4
3884	L 5
3885	K 5
3887	G18
3891	J 6
3895	F 2
3896	F 2
3897	F 2
3898	G 2
3899	G 2
4899	F18
5860	G12
5862	N14
6857	A18
7820	C 3
7850	C 6
7851	K19
7856	H19
7860	B15
7861	M16
7862	J 3
9527	H 2
9607	F18
9899	H12

2501 E 2	2584 C 2	2725 B 7	2861 B 2	3546 C 4	3609 E 6	3674 D 9	3722 B 8	3764 A 7	3861 A 4	4520 E 4	4557 E 6	4641 C 6	4678 D 5	4798 E 9	7631 C 9	7787 E 9	T023 B 2	T052 A 6	T083 E 6	T123 D 9	T165 A 9
2502 D 4	2585 D 2	2726 B 7	2862 A 3	3547 E 2	3619 B 1	3675 D 8	3724 B 8	3766 A 7	3862 A 3	4521 E 6	4559 E 6	4642 C 6	4681 D 5	4799 C 8	7632 B 9	7788 A 6	T024 B 5	T053 A 6	T084 E 5	T124 D 9	T166 B 9
2513 E 4	2586 D 2	2728 B 8	3500 C 3	3548 E 2	3620 B 1	3676 D 8	3725 B 8	3767 A 6	3864 A 3	4523 D 8	4565 E 4	4643 C 6	4682 D 5	4801 B 2	7633 C 9	7820 A 4	T025 B 5	T054 A 6	T085 E 6	T125 D 7	T167 A 8
2514 D 3	2590 E 6	2729 A 7	3501 E 2	3549 D 4	3623 E 2	3677 D 8	3726 B 7	3769 A 7	3865 B 3	4524 C 8	4566 B 3	4644 C 6	4683 D 5	4802 A 3	7634 B 9	7850 B 4	T026 B 4	T055 B 2	T086 E 5	T126 D 7	T168 A 8
2515 D 2	2591 D 5	2730 A 7	3502 D 4	3550 C 3	3625 E 2	3678 D 8	3727 A 7	3771 E 9	3867 B 3	4525 D 2	4568 A 7	4645 D 6	4687 D 5	4803 A 3	7640 C 7	7851 E 6	T027 A 4	T056 A 5	T087 E 6	T127 E 7	T169 A 8
2516 C 2	2631 C 9	2731 A 7	3504 D 3	3552 E 2	3626 E 2	3680 D 9	3728 A 7	3772 E 8	3869 A 4	4526 E 5	4572 C 6	4646 C 6	4688 D 5	4804 C 3	7650 D 9	7852 B 2	T028 B 3	T057 A 5	T088 E 4	T128 D 7	T170 E 8
2523 E 2	2632 B 9	2732 A 7	3506 E 3	3554 E 2	3633 C 9	3683 C 9	3729 A 7	3774 E 5	3872 B 3	4527 E 4	4574 C 4	4647 C 6	4689 E 6	4805 C 3	7651 D 9	7853 B 2	T029 B 2	T059 A 5	T089 E 6	T129 E 7	T171 A 7
2524 E 2	2633 C 8	2737 A 8	3508 D 4	3555 E 1	3634 B 9	3685 D 9	3730 A 7	3778 E 9	3874 B 3	4529 B 9	4577 A 5	4648 C 6	4690 D 6	4899 C 4	7652 D 9	7856 B 3	T030 B 2	T060 B 1	T090 E 4	T130 D 7	T172 B 7
2525 E 1	2634 B 8	2738 A 8	3510 D 2	3556 E 2	3638 B 9	3689 D 9	3731 A 7	3779 E 9	3876 C 4	4530 E 6	4578 B 7	4649 C 6	4691 D 5	6551 E 4	7653 D 9	7860 A 2	T031 C 6	T061 E 3	T091 E 6	T131 E 7	T173 C 9
2526 E 2	2635 C 8	2752 E 9	3512 D 3	3567 E 2	3639 C 9	3692 C 9	3732 A 7	3780 E 9	3877 B 3	4531 D 8	4579 D 3	4650 C 7	4694 C 5	6552 D 4	7654 D 9	7861 B 2	T032 B 3	T062 E 4	T092 E 4	T132 D 8	T174 B 9
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2528 D 2	2639 C 7	2782 E 9	3514 C 2	3572 E 5	3644 B 9	3695 C 7	3737 A 9	3782 E 9	3879 A 3	4534 C 8	4581 E 3	4652 D 6	4697 C 5	6554 D 4	7656 E 7	T002 A 3	T034 C 5	T064 E 5	T094 E 1	T134 D 8	T176 C 9
2531 E 2	2640 B 7	2787 E 9	3515 D 2	3573 E 1	3645 C 8	3701 A 9	3739 A 7	3783 E 9	3880 A 5	4535 D 7	4592 B 6	4653 D 6	4698 C 5	7500 C 4	7657 D 7	T003 A 3	T035 C 5	T065 E 5	T095 C 1	T135 E 8	T177 B 5
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2535 E 3	2646 B 7	2836 A 4	3528 D 3	3584 E 2	3650 B 9	3707 A 8	3746 D 7	3795 E 5	3884 A 4	4540 C 7	4597 E 5	4661 D 6	4702 A 7	7504 C 2	7661 D 8	T007 A 4	T039 C 6	T069 B 1	T099 E 1	T142 A 5	
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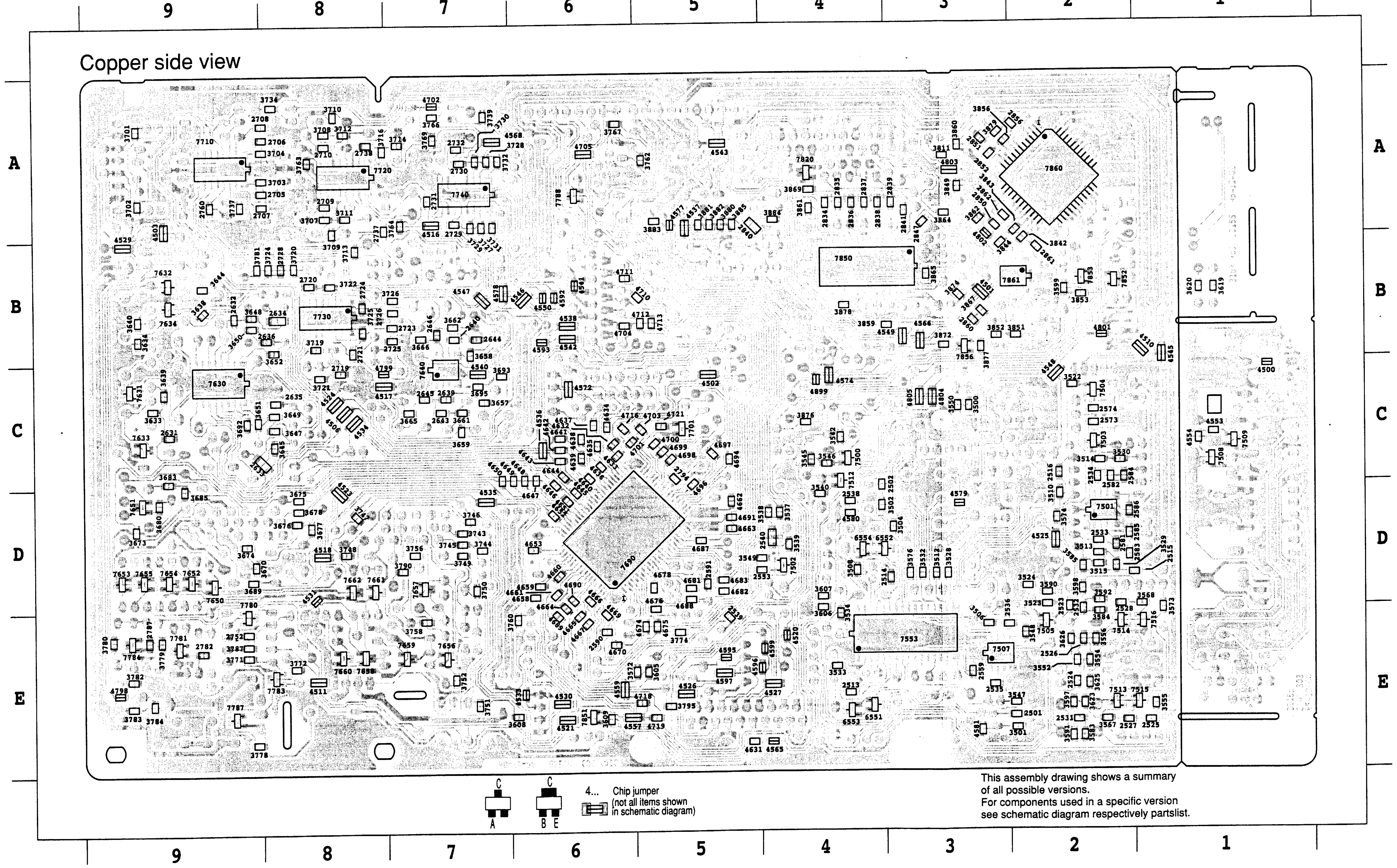

Copper side view

4... Chip jumper
(not all items shown
in schematic diagram)

This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

0002 A 9	1720 E 1	2503 A 7	2544 A 8	2589 D 8	2716 E 2	2831 D 7	3518 C 9
0003 D 9	1730 E 2	2504 B 7	2550 B 6	2637 C 1	2717 D 2	2832 D 8	3519 B 8
0004 A 9	1740 A 4	2505 A 7	2552 B 8	2638 D 1	2718 D 2	2833 D 6	3520 C 8
0007 E 9	1741 B 1	2506 B 6	2555 C 7	2641 C 3	2722 D 3	2842 D 8	3521 C 8
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1552 C 8	1750 D 4	2509 A 9	2558 B 7	2648 D 3	2734 A 5	2845 C 7	3527 A 7
1553 C 7	1820 D 8	2511 A 6	2560 B 7	2691 D 1	2735 E 1	2846 C 8	3531 A 7
1554 C 9	1824 D 8	2512 B 6	2561 A 7	2692 D 1	2761 E 3	2848 E 8	3535 B 6
1555 C 9	1825 E 6	2517 A 6	2563 B 9	2693 C 1	2762 E 3	2849 E 7	3536 A 6
1556 B 9	1826 E 6	2518 B 6	2564 B 9	2694 C 3	2763 E 3	2855 E 5	3541 A 8
1557 C 8	1828 D 5	2519 C 8	2565 A 9	2701 E 1	2765 E 3	2858 D 7	3543 A 6
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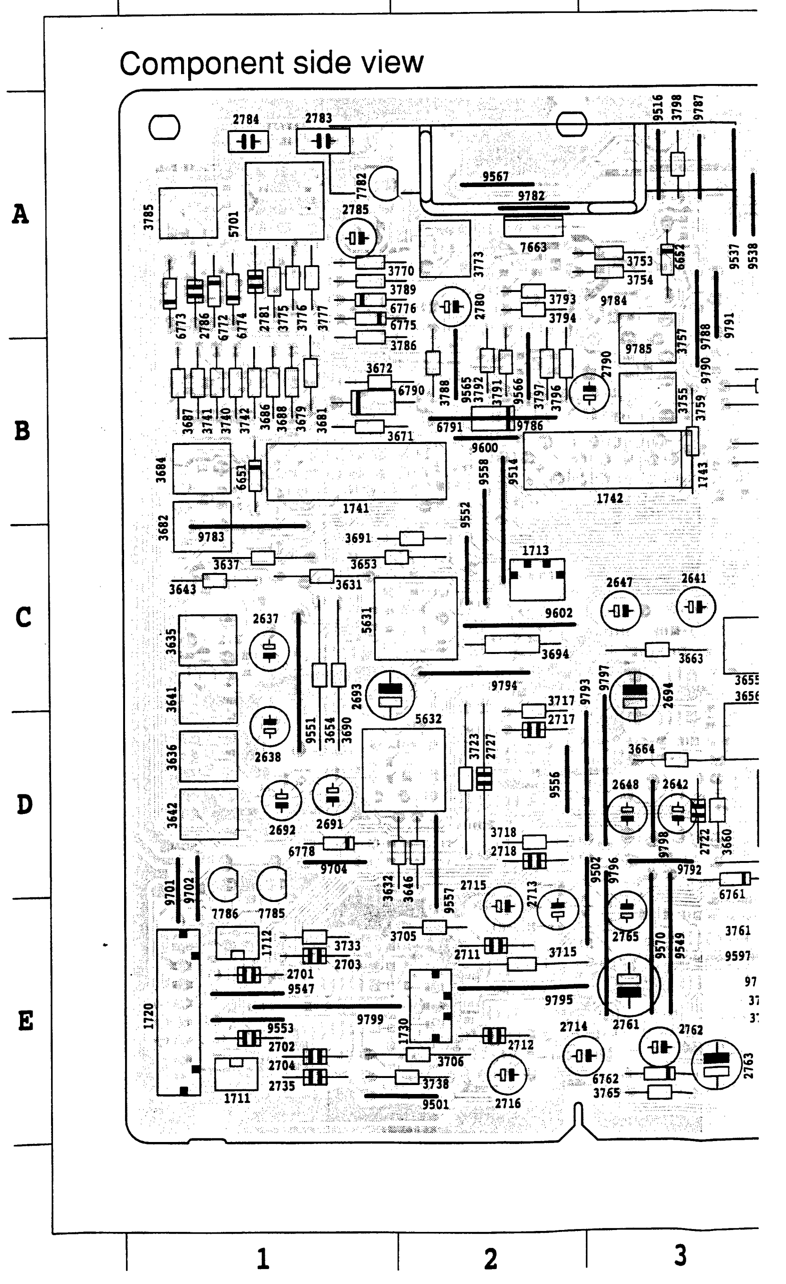

Component side view

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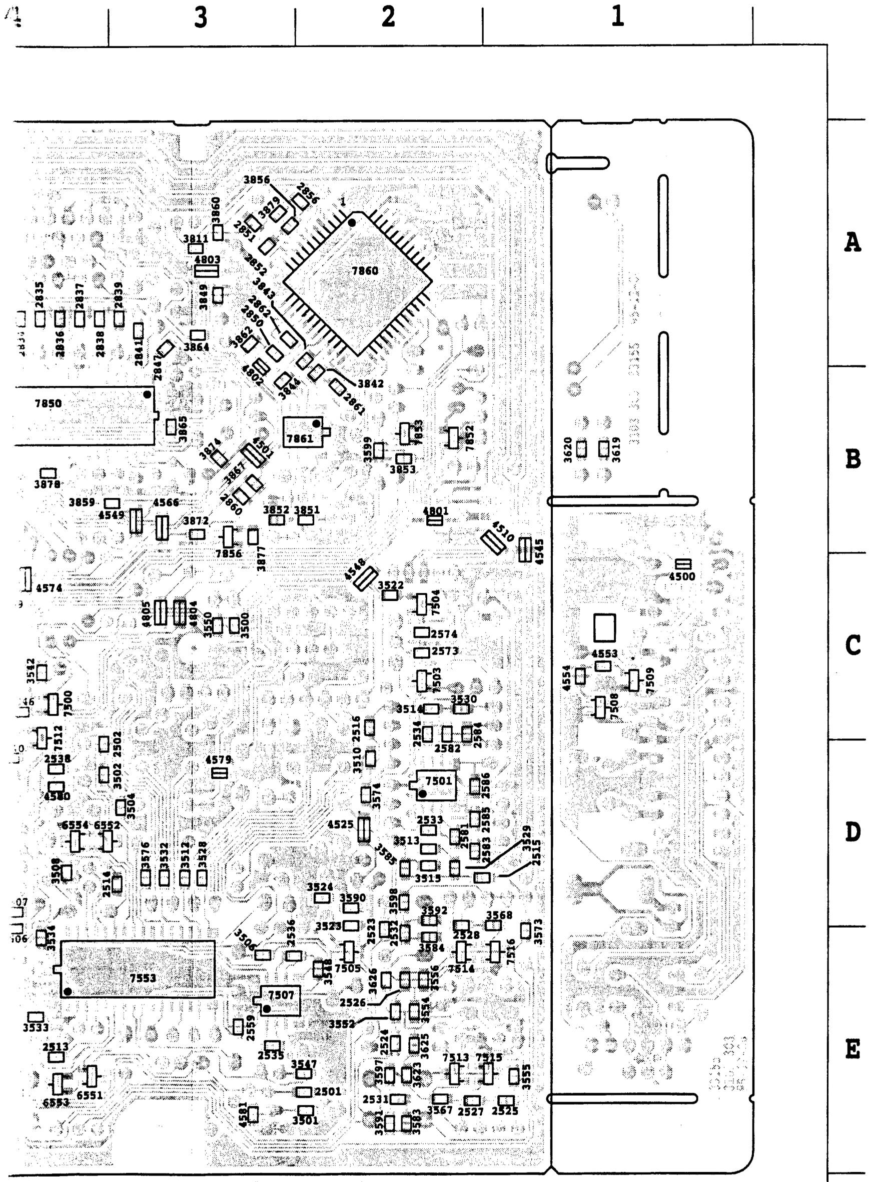
D 5	4801 B 2	7633 C 9	7820 A 4	T025 B 5	T054 A 6	T085 E 6	T125 D 7	T167 A 8
D 5	4802 A 3	7634 B 9	7850 B 4	T026 B 4	T055 B 2	T086 E 5	T126 D 7	T168 A 8
D 5	4803 A 3	7640 C 7	7851 E 6	T027 A 4	T056 A 5	T087 E 6	T127 E 7	T169 A 8
D 5	4804 C 3	7650 D 9	7852 B 2	T028 B 3	T057 A 5	T088 E 4	T128 D 7	T170 E 8
E 6	4805 C 3	7651 D 9	7853 B 2	T029 B 2	T059 A 5	T089 E 6	T129 E 7	T171 A 7
D 6	4899 C 4	7652 D 9	7856 B 3	T030 B 2	T060 B 1	T090 E 4	T130 D 7	T172 B 7
D 5	6551 E 4	7653 D 9	7860 A 2	T031 C 6	T061 E 3	T091 E 6	T131 E 7	T173 C 9
C 5	6552 D 4	7654 D 9	7861 B 2	T032 B 3	T062 E 4	T092 E 4	T132 D 8	T174 B 9
D 5	6553 E 4	7655 D 9	T001 A 4	T033 C 6	T063 A 5	T093 E 1	T133 E 7	T175 C 8
C 5	6554 D 4	7656 E 7	T002 A 3	T034 C 5	T064 E 5	T094 E 1	T134 D 8	T176 C 9
C 5	7500 C 4	7657 D 7	T003 A 3	T035 C 5	T065 E 5	T095 C 1	T135 E 8	T177 B 5
C 5	7501 D 2	7658 E 8	T004 A 4	T036 C 5	T066 D 3	T096 C 1	T139 B 6	
C 5	7502 D 4	7659 E 7	T005 A 3	T037 C 5	T067 E 3	T097 D 1	T140 B 6	
C 6	7503 C 2	7660 E 8	T006 A 4	T038 C 6	T068 E 5	T098 D 1	T141 B 6	
A 7	7504 C 2	7661 D 8	T007 A 4	T039 C 6	T069 B 1	T099 E 1	T142 A 5	
C 5	7505 E 2	7662 D 8	T008 A 4	T040 C 6	T070 B 1	T100 E 6	T143 B 6	
B 6	7507 E 3	7690 D 6	T009 A 3	T041 C 6	T071 B 1	T113 D 8	T144 A 6	
A 6	7508 C 1	7701 C 5	T010 A 4	T042 C 2	T072 D 2	T114 D 8	T145 B 6	
B 5	7509 C 1	7710 A 9	T011 A 4	T043 A 2	T073 B 2	T115 D 8	T146 B 6	
B 6	7512 C 4	7720 A 8	T012 A 4	T045 C 2	T074 C 3	T116 D 9	T147 D 5	
B 5	7513 E 1	7730 B 8	T013 A 4	T046 C 2	T076 C 3	T117 C 9	T148 E 5	
B 5	7514 E 2	7740 A 7	T014 B 3	T047 A 6	T078 A 5	T118 D 9	T149 E 7	
C 6	7515 E 2	7780 E 9	T015 A 5	T048 B 6	T079 C 3	T119 D 9	T161 B 9	
E 5	7516 E 1	7781 E 9	T016 A 5	T049 A 3	T080 D 3	T120 D 9	T162 E 9	
E 5	7553 E 3	7783 E 8	T018 A 3	T050 B 3	T081 C 2	T121 D 9	T163 A 9	
C 5	7630 C 9	7784 E 9	T019 A 4	T051 A 5	T082 C 2	T122 D 9	T164 A 9	



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For components used in a specific version
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0002 A 9	1720 E 1	2503 A 7	2544 A 8	2589 D 8	2716 E 2	2831 D 7	3518 C 9	3562 C 9	3601 C 5	3671 B 1	3736 E 4	3788 B 2	3868 D 8	4657 B 4	5632 D 2	6791 B 2	9514 B 2	9540 C 3	9564 A 6	9602 C 2	9785 B 3
0003 D 9	1730 E 2	2504 B 7	2550 B 6	2637 C 1	2717 D 2	2832 D 8	3519 B 8	3563 B 9	3621 A 8	3672 B 1	3738 E 2	3789 A 1	3870 E 8	4668 A 4	5701 A 1	6792 C 6	9516 A 3	9541 B 7	9565 B 2	9603 C 6	9786 B 2
0004 A 9	1740 A 4	2505 A 7	2552 B 8	2638 D 1	2718 D 2	2833 D 6	3520 C 8	3564 B 9	3622 A 9	3679 B 1	3740 B 1	3791 B 2	3871 E 8	4671 A 4	5790 C 5	6857 D 4	9517 A 6	9542 C 4	9566 B 2	9604 D 6	9787 A 3
0007 E 9	1741 B 1	2506 B 6	2555 C 7	2641 C 3	2722 D 3	2842 D 8	3521 C 8	3565 A 9	3624 A 9	3681 B 1	3741 B 1	3792 B 2	3873 C 4	4672 A 4	5791 B 5	7663 A 2	9518 C 6	9543 C 4	9567 A 2	9605 D 6	9788 A 3
1504 D 9	1742 B 3	2507 A 7	2556 C 6	2642 D 3	2727 D 2	2843 B 7	3525 D 8	3566 A 8	3631 C 1	3682 C 1	3742 B 1	3793 A 2	3875 E 8	4673 A 4	5860 E 7	7782 A 1	9519 C 6	9544 C 6	9570 E 3	9606 C 6	9789 D 3
1505 C 8	1743 B 3	2508 B 6	2557 B 8	2647 C 3	2733 B 6	2844 B 7	3526 D 8	3569 B 9	3632 D 2	3684 B 1	3753 A 3	3794 A 2	3886 C 6	4677 A 5	5862 C 8	7785 D 1	9520 C 5	9545 C 5	9571 E 5	9607 C 6	9790 A 3
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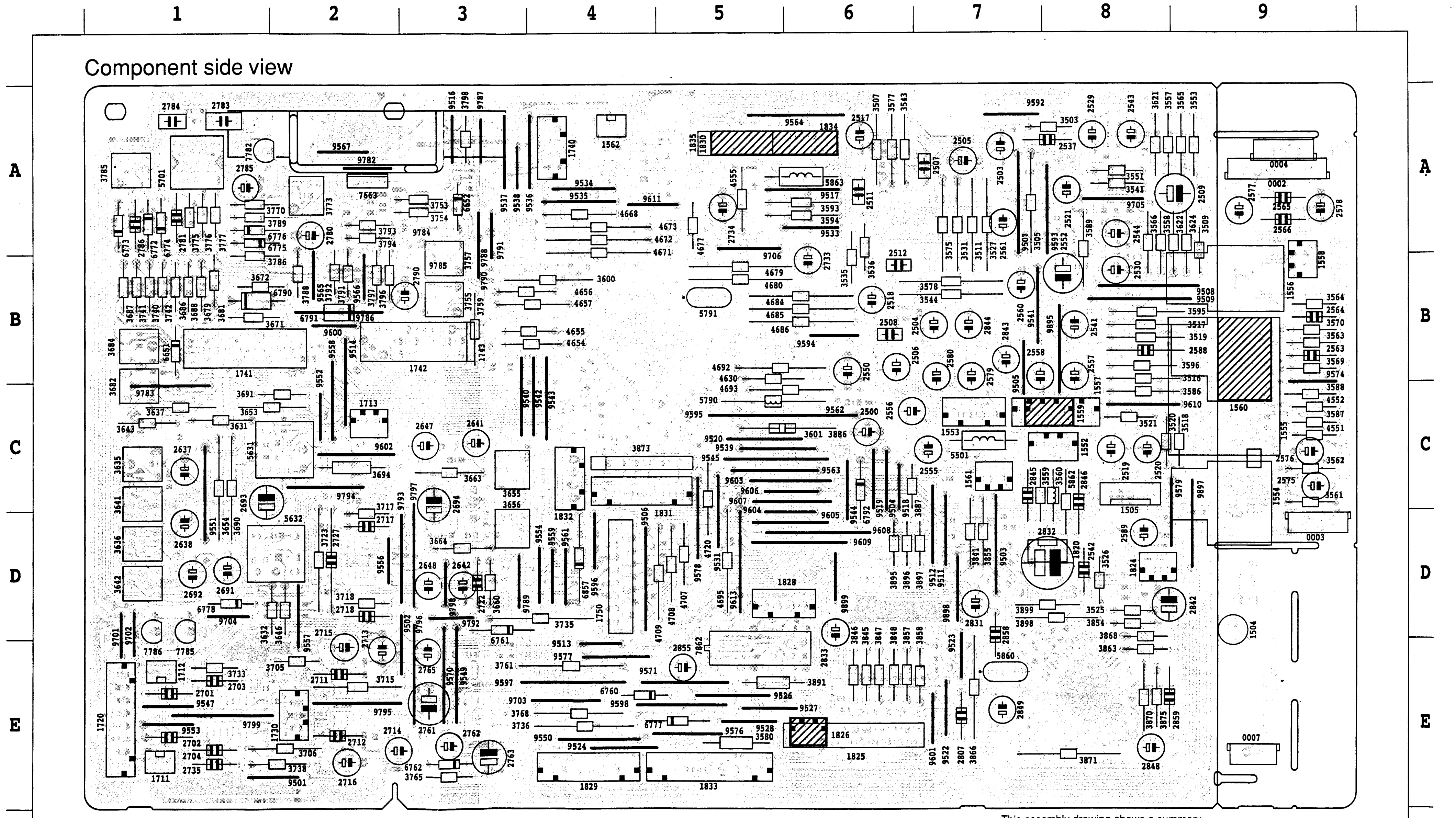
1712 E 1	1835 A 5	2542 D 8	2580 B 7	2714 E 2	2790 B 3	3516 B 8	3560 C 8	3596 B 8	3663 C 3	3733 E 1	3785 A 1	3863 E 8	4655 B 4	5501 C 7	6778 D 1	9512 D 7	9538 A 3	9562 C 6	9600 B 2	9783 C 1	9899 D 6
1713 C 2	2500 C 6	2543 A 8	2588 B 8	2715 E 2	2807 E 7	3517 B 8	3561 C 9	3600 B 4	3664 D 3	3735 D 4	3786 B 1	3866 E 7	4656 B 3	5631 C 2	6790 B 1	9513 E 4	9539 C 5	9563 C 5	9601 E 7	9784 A 3	

Component side view



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For components used in a specific version
see schematic diagram respectively partslist.

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2502 D 4	2585 D 2	2726 B 7	2862 A 3	3547 E 2	3619 B 1	3675 D 8	3724 B 8	3766 A 7	3862 A 3	4521 E 6	4559 E 6	4642 C 6	4681 D 5	4799 C 8	7632 B 9	7788 A 6	T024 B 5	T053 A 6	T084 E 5	T124 D 9	T166 B 9
2513 E 4	2586 D 2	2728 B 8	3500 C 3	3548 E 2	3620 B 1	3676 D 8	3725 B 8	3767 A 6	3864 A 3	4523 D 8	4565 E 4	4643 C 6	4682 D 5	4801 B 2	7633 C 9	7820 A 4	T025 B 5	T054 A 6	T085 E 6	T125 D 7	T167 A 8
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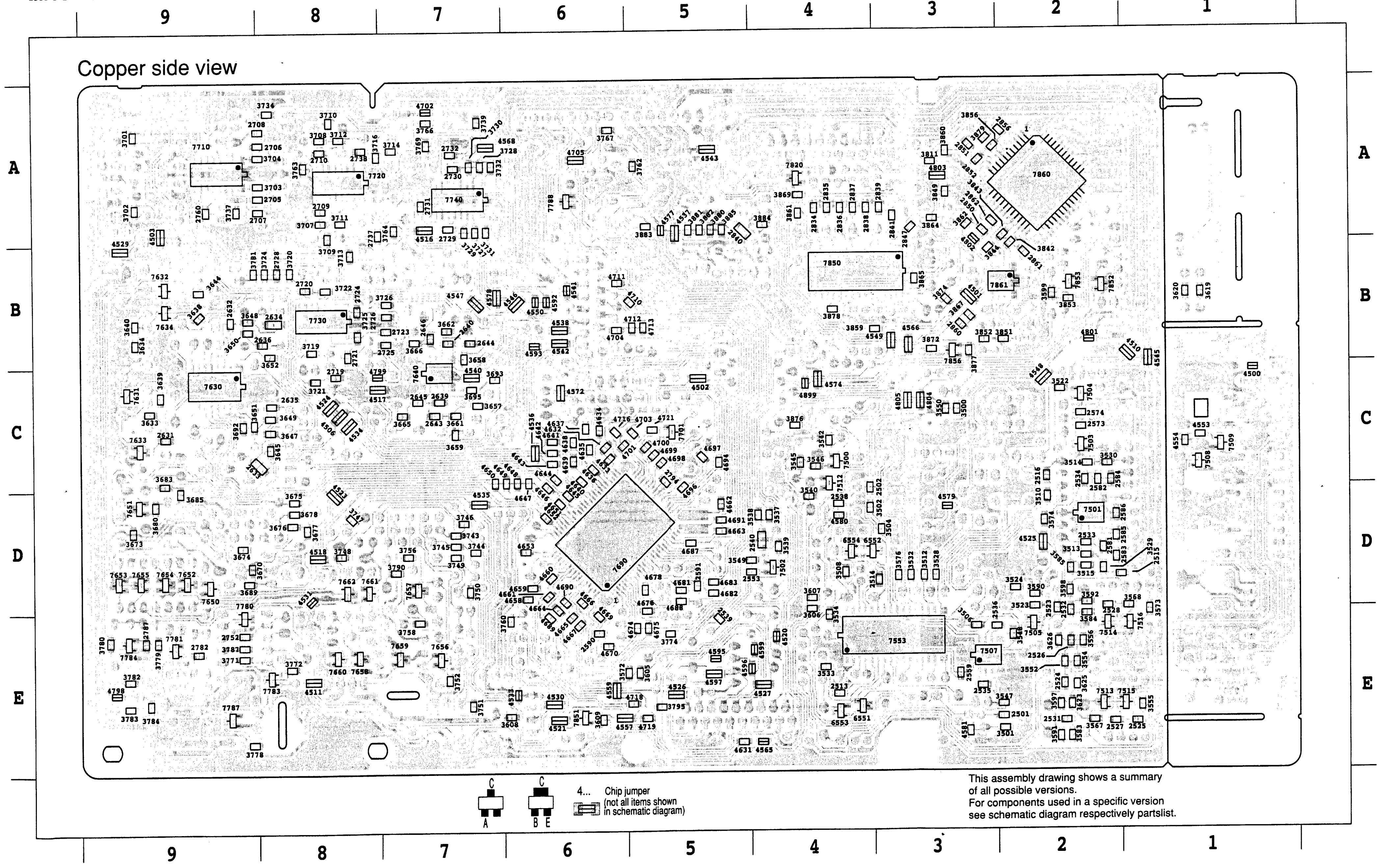
2532 E 2	2643 C 7	2794 C 5	3522 C 2	3574 D 2	3647 C 8	3702 A 9	3743 D 7	3784 E 9	3881 A 5	4536 C 6	4593 B 6	4658 D 6	4699 C 5	7501 D 2	7658 E 8	T004 A 4	T036 C 5	T066 D 3	T096 C 1	T139 B 6	
2533 D 2	2644 B 7	2834 A 4	3523 D 2	3576 D 3	3648 B 9	3703 A 8	3744 D 7	3787 E 9	3882 A 5	4537 A 5	4595 E 5	4659 D 6	4700 C 5	7502 D 4	7659 E 7	T005 A 3	T037 C 5	T067 E 3	T097 D 1	T140 B 6	
2534 C 2	2645 C 7	2835 A 4	3524 D 2	3583 E 2	3649 C 8	3704 A 8	3745 D 7	3790 D 7	3883 A 5	4538 B 6	4596 E 4	4660 D 6	4701 C 6	7503 C 2	7660 E 8	T006 A 4	T038 C 6	T068 E 5	T098 D 1	T141 B 6	
2535 E 3	2646 B 7	2836 A 4	3528 D 3	3584 E 2	3650 B 9	3707 A 8	3746 D 7	3795 E 5	3884 A 4	4540 C 7	4597 E 5	4661 D 6	4702 A 7	7504 C 2	7661 D 8	T007 A 4	T039 C 6	T069 B 1	T099 E 1	T142 A 5	
2536 E 3	2705 A 8	2837 A 4	3529 D 2	3585 D 2	3651 C 9	3708 A 8	3747 D 8	3811 A 3	3885 A 5	4541 B 6	4599 E 4	4662 D 5	4703 C 5	7505 E 2	7662 D 8	T008 A 4	T040 C 6	T070 B 1	T100 E 6	T143 B 6	
2538 D 4	2706 A 8	2838 A 4	3530 C 2	3590 D 2	3652 B 8	3709 A 8	3748 D 8	3842 B 2	4500 C 1	4542 B 6	4631 E 5	4663 D 5	4704 B 6	7507 E 3	7690 D 6	T009 A 3	T041 C 6	T071 B 1	T113 D 8	T144 A 6	
2539 E 5	2707 A 8	2839 A 3	3532 D 3	3591 E 2	3657 C 7	3710 A 8	3749 D 7	3843 A 2	4501 B 3	4543 A 5	4632 C 6	4664 D 6	4705 A 6	7508 C 1	7701 C 5	T010 A 4	T042 C 2	T072 D 2	T114 D 8	T145 B 6	
2540 D 4	2708 A 8	2840 A 5	3533 E 4	3592 D 2	3658 B 7	3711 A 8	3750 D 7	3844 B 3	4502 C 5	4545 B 1	4633 C 6	4665 E 6	4710 B 5	7509 C 1	7710 A 9	T011 A 4	T043 A 2	T073 B 2	T115 D 8	T146 B 6	
2553 D 4	2709 A 8	2841 A 3	3534 E 4	3597 E 2	3659 C 7	3712 A 8	3751 E 7	3849 A 3	4503 A 9	4546 B 6	4634 C 6	4666 D 6	4711 B 6	7512 C 4	7720 A 8	T012 A 4	T045 C 2	T074 C 3	T116 D 9	T147 D 5	
2559 E 3	2710 A 8	2847 A 3	3537 D 4	3598 D 2	3661 C 7	3713 B 8	3752 E 7	3851 B 2	4506 C 8	4547 B 7	4635 C 6	4667 E 6	4712 B 5	7513 E 1	7730 B 8	T013 A 4	T046 C 2	T076 C 3	T117 C 9	T148 E 5	
2573 C 2	2719 C 8	2850 A 3	3538 D 4	3599 B 2	3662 B 7	3714 A 7	3756 D 7	3852 B 3	4510 B 1	4548 C 2	4636 C 6	4669 E 6	4713 B 5	7514 E 2	7740 A 7	T014 B 3	T047 A 6	T078 A 5	T118 D 9	T149 E 7	
2574 C 2	2720 B 8	2851 A 3	3539 D 4	3605 E 5	3665 C 7	3716 A 8	3758 E 7	3853 B 2	4511 E 8	4549 B 3	4637 C 6	4670 E 6	4716 C 6	7515 E 2	7780 E 9	T015 A 5	T048 B 6	T079 C 3	T119 D 9	T161 B 9	
2581 D 2	2721 B 8	2852 A 3	3540 D 4	3606 E 4	3666 B 7	3719 B 8	3760 E 6	3856 A 3	4516 A 7	4550 B 6	4638 C 6	4674 E 5	4718 E 5	7516 E 1	7781 E 9	T016 A 5	T049 A 3	T080 D 3	T120 D 9	T162 E 9	
2582 C 2	2723 B 7	2856 A 2	3542 C 4	3607 D 4	3670 D 9	3720 B 8	3762 A 5	3859 B 3	4517 C 8	4553 C 1	4639 C 6	4675 E 5	4719 E 5	7553 E 3	7783 E 8	T018 A 3	T050 B 3	T081 C 2	T121 D 9	T163 A 9	
2583 D 2	2724 B 8	2860 B 3	3545 C 4	3608 E 6	3673 D 9	3721 C 8	3763 A 8	3860 A 3	4518 D 8	4554 C 1	4640 C 6	4676 E 5	4721 C 5	7630 C 9	7784 E 9	T019 A 4	T051 A 5	T082 C 2	T122 D 9	T164 A 9	

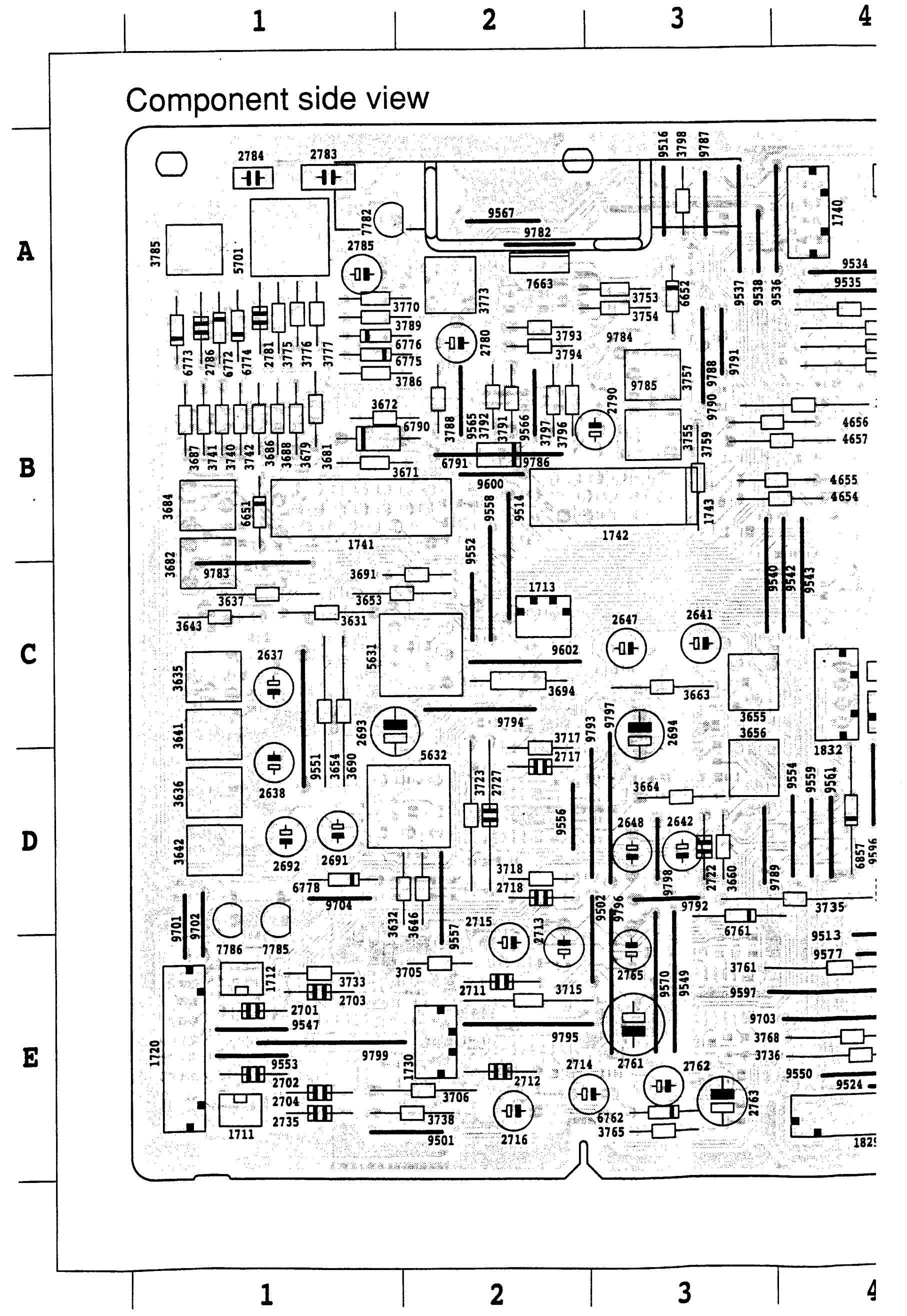


Copper side view

4... Chip jumper (not all items shown in schematic diagram)

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

0002 A 9	1720 E 1	2503 A 7	2544 A 8	2589 D 8	2716 E 2	2831 D 7	3518 C 9	3562 C 9	360
0003 D 9	1730 E 2	2504 B 7	2550 B 6	2637 C 1	2717 D 2	2832 D 8	3519 B 8	3563 B 9	362
0004 A 9	1740 A 4	2505 A 7	2552 B 8	2638 D 1	2718 D 2	2833 D 6	3520 C 8	3564 B 9	362
0007 E 9	1741 B 1	2506 B 6	2555 C 7	2641 C 3	2722 D 3	2842 D 8	3521 C 8	3565 A 9	362
1504 D 9	1742 B 3	2507 A 7	2556 C 6	2642 D 3	2727 D 2	2843 B 7	3525 D 8	3566 A 8	363
1505 C 8	1743 B 3	2508 B 6	2557 B 8	2647 C 3	2733 B 6	2844 B 7	3526 D 8	3569 B 9	363
1552 C 8	1750 D 4	2509 A 9	2558 B 7	2648 D 3	2734 A 5	2845 C 7	3527 A 7	3570 B 9	363
1553 C 7	1820 D 8	2511 A 6	2560 B 7	2691 D 1	2735 E 1	2846 C 8	3531 A 7	3575 A 7	363
1554 C 9	1824 D 8	2512 B 6	2561 A 7	2692 D 1	2761 E 3	2848 E 8	3535 B 6	3577 A 6	363
1555 C 9	1825 E 6	2517 A 6	2563 B 9	2693 C 1	2762 E 3	2849 E 7	3536 A 6	3578 B 7	364
1556 B 9	1826 E 6	2518 B 6	2564 B 9	2694 C 3	2763 E 3	2855 E 5	3541 A 8	3580 E 5	364
1557 C 8	1828 D 5	2519 C 8	2565 A 9	2701 E 1	2765 E 3	2858 D 7	3543 A 6	3586 C 8	364
1558 B 9	1829 E 4	2520 C 8	2566 A 9	2702 E 1	2780 A 2	2859 E 8	3544 B 7	3587 C 9	364
1559 C 8	1830 A 5	2521 A 8	2575 C 9	2703 E 1	2781 A 1	3503 A 8	3551 A 8	3588 C 9	365
1560 B 9	1831 C 4	2529 A 8	2576 C 9	2704 E 1	2783 A 1	3505 A 7	3553 A 9	3589 A 8	365
1561 C 7	1832 C 4	2530 B 8	2577 A 9	2711 E 2	2784 A 1	3507 A 6	3557 A 8	3593 A 6	365
1562 A 4	1833 E 5	2537 A 8	2578 A 9	2712 E 2	2785 A 1	3509 A 9	3558 A 8	3594 A 6	365
1711 E 1	1834 A 5	2541 B 8	2579 B 7	2713 E 2	2786 A 1	3511 A 7	3559 C 7	3595 B 8	366
1712 E 1	1835 A 5	2542 D 8	2580 B 7	2714 E 2	2790 B 3	3516 B 8	3560 C 8	3596 B 8	366
1713 C 2	2500 C 6	2543 A 8	2588 B 8	2715 E 2	2807 E 7	3517 B 8	3561 C 9	3600 B 4	366



Component side view

9	7631 C 9	7787 E 9	T023 B 2	T052 A 6	T083 E 6	T123 D 9	T165 A 9
8	7632 B 9	7788 A 6	T024 B 5	T053 A 6	T084 E 5	T124 D 9	T166 B 9
2	7633 C 9	7820 A 4	T025 B 5	T054 A 6	T085 E 6	T125 D 7	T167 A 8
3	7634 B 9	7850 B 4	T026 B 4	T055 B 2	T086 E 5	T126 D 7	T168 A 8
3	7640 C 7	7851 E 6	T027 A 4	T056 A 5	T087 E 6	T127 E 7	T169 A 8
3	7650 D 9	7852 B 2	T028 B 3	T057 A 5	T088 E 4	T128 D 7	T170 E 8
3	7651 D 9	7853 B 2	T029 B 2	T059 A 5	T089 E 6	T129 E 7	T171 A 7
4	7652 D 9	7856 B 3	T030 B 2	T060 B 1	T090 E 4	T130 D 7	T172 B 7
4	7653 D 9	7860 A 2	T031 C 6	T061 E 3	T091 E 6	T131 E 7	T173 C 9
4	7654 D 9	7861 B 2	T032 B 3	T062 E 4	T092 E 4	T132 D 8	T174 B 9
4	7655 D 9	T001 A 4	T033 C 6	T063 A 5	T093 E 1	T133 E 7	T175 C 8
4	7656 E 7	T002 A 3	T034 C 5	T064 E 5	T094 E 1	T134 D 8	T176 C 9
4	7657 D 7	T003 A 3	T035 C 5	T065 E 5	T095 C 1	T135 E 8	T177 B 5
2	7658 E 8	T004 A 4	T036 C 5	T066 D 3	T096 C 1	T139 B 6	
4	7659 E 7	T005 A 3	T037 C 5	T067 E 3	T097 D 1	T140 B 6	
2	7660 E 8	T006 A 4	T038 C 6	T068 E 5	T098 D 1	T141 B 6	
2	7661 D 8	T007 A 4	T039 C 6	T069 B 1	T099 E 1	T142 A 5	
2	7662 D 8	T008 A 4	T040 C 6	T070 B 1	T100 E 6	T143 B 6	
3	7690 D 6	T009 A 3	T041 C 6	T071 B 1	T113 D 8	T144 A 6	
1	7701 C 5	T010 A 4	T042 C 2	T072 D 2	T114 D 8	T145 B 6	
1	7710 A 9	T011 A 4	T043 A 2	T073 B 2	T115 D 8	T146 B 6	
4	7720 A 8	T012 A 4	T045 C 2	T074 C 3	T116 D 9	T147 D 5	
1	7730 B 8	T013 A 4	T046 C 2	T076 C 3	T117 C 9	T148 E 5	
2	7740 A 7	T014 B 3	T047 A 6	T078 A 5	T118 D 9	T149 E 7	
2	7780 E 9	T015 A 5	T048 B 6	T079 C 3	T119 D 9	T161 B 9	
1	7781 E 9	T016 A 5	T049 A 3	T080 D 3	T120 D 9	T162 E 9	
3	7783 E 8	T018 A 3	T050 B 3	T081 C 2	T121 D 9	T163 A 9	
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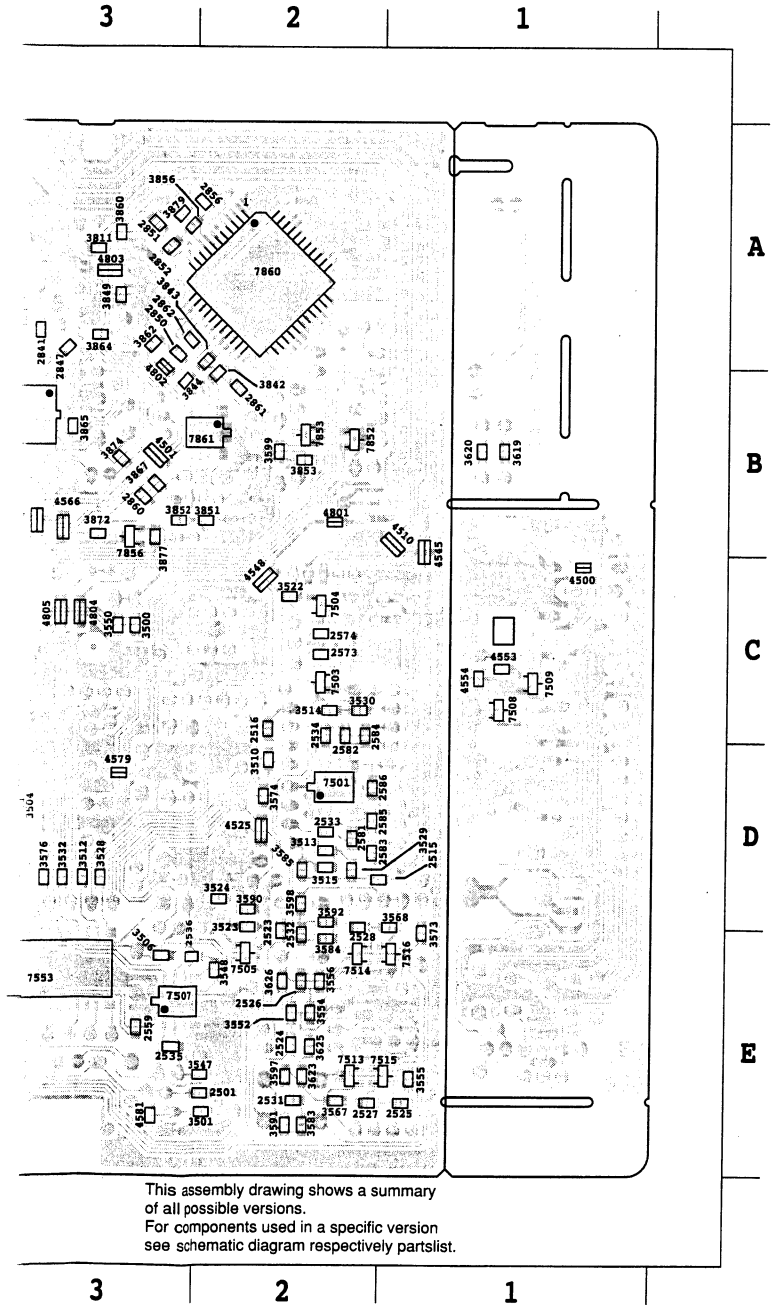
3 2 1

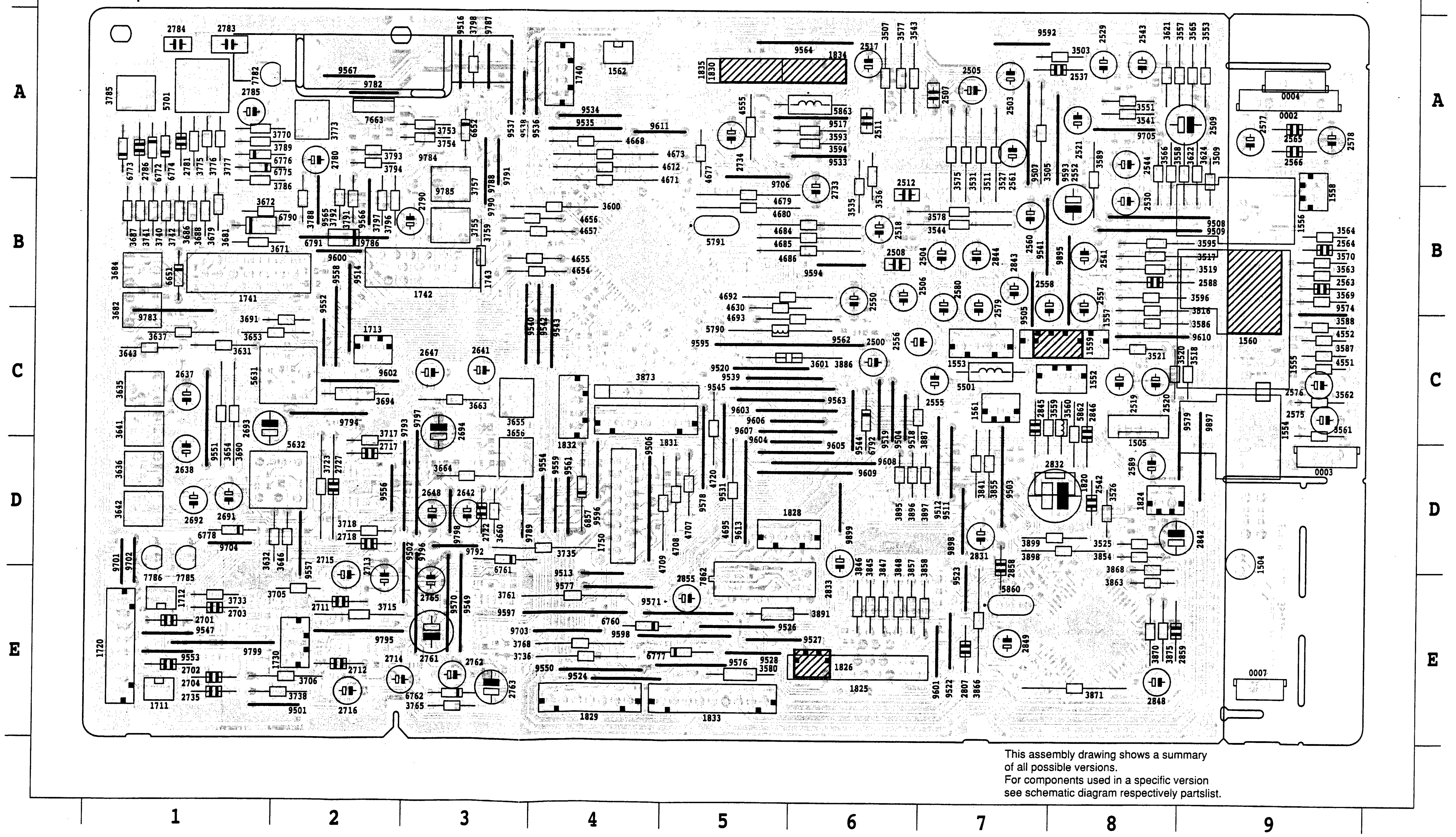


This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

0002 A 9	1720 E 1	2503 A 7	2544 A 8	2589 D 8	2716 E 2	2831 D 7	3518 C 9	3562 C 9	3601 C 5	3671 B 1	3736 E 4	3788 B 2	3868 D 8	4657 B 4	5632 D 2	6791 B 2	9514 B 2	9540 C 3	9564 A 6	9602 C 2	9785 B 3
0003 D 9	1730 E 2	2504 B 7	2550 B 6	2637 C 1	2717 D 2	2832 D 8	3519 B 8	3563 B 9	3621 A 8	3672 B 1	3738 E 2	3789 A 1	3870 E 8	4668 A 4	5701 A 1	6792 C 6	9516 A 3	9541 B 7	9565 B 2	9603 C 6	9786 B 2
0004 A 9	1740 A 4	2505 A 7	2552 B 8	2638 D 1	2718 D 2	2833 D 6	3520 C 8	3564 B 9	3622 A 9	3679 B 1	3740 B 1	3791 B 2	3871 E 8	4671 A 4	5790 C 5	6857 D 4	9517 A 6	9542 C 4	9566 B 2	9604 D 6	9787 A 3
0007 E 9	1741 B 1	2506 B 6	2555 C 7	2641 C 3	2722 D 3	2842 D 8	3521 C 8	3565 A 9	3624 A 9	3681 B 1	3741 B 1	3792 B 2	3873 C 4	4672 A 4	5791 B 5	7663 A 2	9518 C 6	9543 C 4	9567 A 2	9605 D 6	9788 A 3
1504 D 9	1742 B 3	2507 A 7	2556 C 6	2642 D 3	2727 D 2	2843 B 7	3525 D 8	3566 A 8	3631 C 1	3682 C 1	3742 B 1	3793 A 2	3875 E 8	4673 A 4	5860 E 7	7782 A 1	9519 C 6	9544 C 6	9570 E 3	9606 C 6	9789 D 3
1505 C 8	1743 B 3	2508 B 6	2557 B 8	2647 C 3	2733 B 6	2844 B 7	3526 D 8	3569 B 9	3632 D 2	3684 B 1	3753 A 3	3794 A 2	3886 C 6	4677 A 5	5862 C 8	7785 D 1	9520 C 5	9545 C 5	9571 E 5	9607 C 6	9790 A 3
1552 C 8	1750 D 4	2509 A 9	2558 B 7	2648 D 3	2734 A 5	2845 C 7	3527 A 7	3570 B 9	3635 C 1	3686 B 1	3754 A 3	3796 B 2	3887 C 6	4679 B 5	5863 A 6	7786 D 1	9522 E 7	9547 E 1	9574 B 9	9608 D 6	9791 A 3
1553 C 7	1820 D 8	2511 A 6	2560 B 7	2691 D 1	2735 E 1	2846 C 8	3531 A 7	3575 A 7	3636 D 1	3687 B 1	3755 B 3	3797 B 2	3891 E 5	4680 B 5	6651 B 1	7862 E 5	9523 E 7	9549 E 3	9576 E 5	9609 D 6	9792 D 3
1554 C 9	1824 D 8	2512 B 6	2561 A 7	2692 D 1	2761 E 3	2848 E 8	3535 B 6	3577 A 6	3637 C 1	3688 B 1	3757 B 3	3798 A 3	3895 D 6	4684 B 6	6652 A 3	9501 E 2	9524 E 4	9550 E 4	9577 E 4	9610 C 8	9793 D 3
1555 C 9	1825 E 6	2517 A 6	2563 B 9	2693 C 1	2762 E 3	2849 E 7	3536 A 6	3578 B 7	3641 C 1	3690 C 1	3759 B 3	3841 D 7	3896 D 6	4685 B 6	6760 E 4	9502 E 3	9526 E 5	9551 C 1	9578 D 5	9611 A 4	9794 C 2
1556 B 9	1826 E 6	2518 B 6	2564 B 9	2694 C 3	2763 E 3	2855 E 5	3541 A 8	3580 E 5	3642 D 1	3691 C 2	3761 E 4	3845 E 6	3897 D 7	4686 B 6	6761 D 3	9503 D 7	9527 E 5	9552 C 2	9579 D 9	9613 D 5	9795 E 2
1557 C 8	1828 D 5	2519 C 8	2565 A 9	2701 E 1	2765 E 3	2858 D 7	3543 A 6	3586 C 8	3643 C 1	3694 C 2	3765 E 3	3846 E 6	3898 D 8	4692 B 5	6762 E 3	9504 C 6	9528 E 5	9553 E 1	9592 A 7	9701 D 1	9796 E 3
1558 B 9	1829 E 4	2520 C 8	2566 A 9	2702 E 1	2780 A 2	2859 E 8	3544 B 7	3587 C 9	3646 D 2	3705 E 2	3768 E 4	3847 E 6	3899 D 8	4693 C 6	6772 A 1	9505 B 7	9531 D 5	9554 D 4	9593 A 8	9702 D 1	9797 D 3
1559 C 8	1830 A 5	2521 A 8	2575 C 9	2703 E 1	2781 A 1	3503 A 8	3551 A 8	3588 C 9	3653 C 2	3706 E 2	3770 A 1	3848 E 6	4551 C 9	4695 D 5	6773 A 1	9506 D 4	9533 A 6	9556 D 2	9594 B 6	9703 E 4	9798 D 3
1560 B 9	1831 C 4	2529 A 8	2576 C 9	2704 E 1	2783 A 1	3505 A 7	3553 A 9	3589 A 8	3654 C 1	3715 E 2	3773 A 2	3854 D 8	4552 C 9	4707 D 5	6774 A 1	9507 A 7	9534 A 4	9557 D 2	9595 C 5	9704 D 1	9799 E 1
1561 C 7	1832 C 4	2530 B 8	2577 A 9	2711 E 2	2784 A 1	3507 A 6	3557 A 8	3593 A 6	3655 C 3	3717 D 2	3775 A 1	3855 D 7	4555 A 5	4708 D 5	6775 A 1	9508 B 8	9535 A 4	9558 C 2	9596 D 4	9705 A 8	9895 B 8
1562 A 4	1833 E 5	2537 A 8	2578 A 9	2712 E 2	2785 A 1	3509 A 9	3558 A 8	3594 A 6	3656 D 3	3718 D 2	3776 A 1	3857 E 6	4630 B 5	4709 D 5	6776 A 1	9509 B 8	9536 A 4	9559 D 4	9597 E 4	9706 A 5	9897 D 9
1711 E 1	1834 A 5	2541 B 8	2579 B 7	2713 E 2	2786 A 1	3511 A 7	3559 C 7	3595 B 8	3660 D 3	3723 D 2	3777 A 1	3858 E 7	4654 B 4	4720 C 5	6777 E 5	9511 D 7	9537 A 3	9561 D 4	9598 E 5	9782 A 2	9898 D 7
1712 E 1	1835 A 5	2542 D 8	2580 B 7	2714 E 2	2790 B 3	3516 B 8	3560 C 8	3596 B 8	3663 C 3	3733 E 1	3785 A 1	3863 E 8	4655 B 4	5501 C 7	6778 D 1	9512 D 7	9538 A 3	9562 C 6	9600 B 2	9783 C 1	9899 D 6
1713 C 2	2500 C 6	2543 A 8	2588 B 8	2715 E 2	2807 E 7	3517 B 8	3561 C 9	3600 B 4	3664 D 3	3735 D 4	3786 B 1	3866 E 7	4656 B 3	5631 C 2	6790 B 1	9513 E 4	9539 C 5	9563 C 5	9601 E 7	9784 A 3	

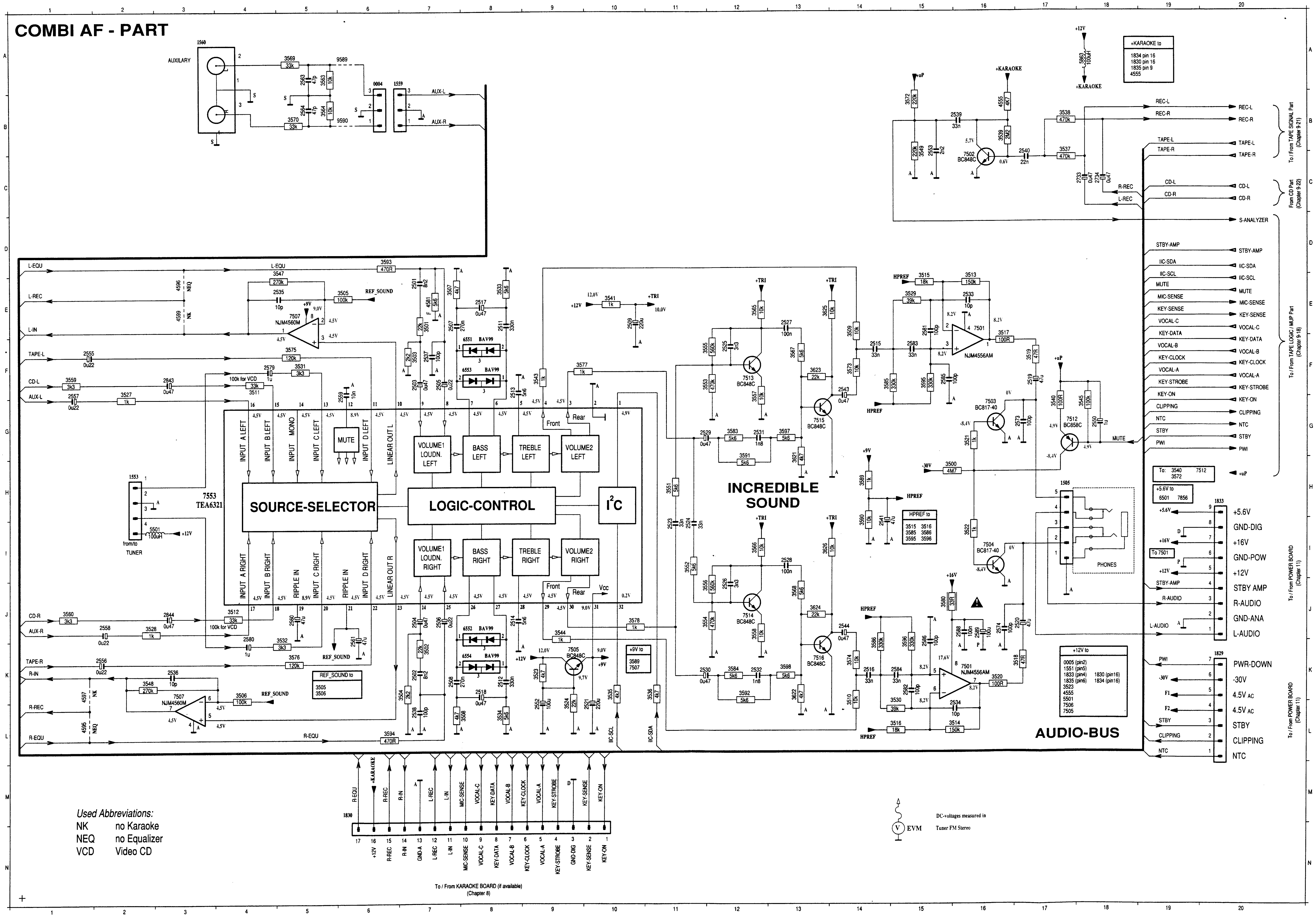
1 2 3 4 5 6 7 8 9

Component side view



This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

COMBI AF - PART


AUXILARY
AUX-L
AUX-R
L-EQU
L-REC
L-IN
TAPE-L
CD-L
AUX-L
CD-R
AUX-R
TAPE-R
R-IN
R-REC
R-EQU
7553
TEA6321
SOURCE-SELECTOR
LOGIC-CONTROL
I²C
MUTE
INPUT A LEFT
INPUT B LEFT
INPUT MONO
INPUT C LEFT
INPUT D LEFT
LINEAR OUT L
INPUT A RIGHT
INPUT B RIGHT
RIPPLE IN
INPUT C RIGHT
INPUT D RIGHT
LINEAR OUT R
VOLUME1 LOUDN. LEFT
BASS LEFT
TREBLE LEFT
VOLUME2 LEFT
VOLUME1 LOUDN. RIGHT
BASS RIGHT
TREBLE RIGHT
VOLUME2 RIGHT
Front
Rear
Vcc
REF_SOUND
REF_SOUND to
3505
3506
NJM4560M
from/to TUNER
INCREDIBLE SOUND
HPREF
HPREF to
3515 3516
3585 3586
3595 3596
NJM4556AM
BC848C
BC817-40
BC858C
PHONES
AUDIO-BUS
+KARAOKE to
1834 pin 16
1830 pin 16
1835 pin 9
4555
+12V to
0005 (pin2)
1551 (pin5)
1833 (pin4) 1830 (pin16)
1835 (pin6) 1834 (pin16)
3523
4555
5501
7506
7505
+9V to
3589
7507
REC-L
REC-R
TAPE-L
TAPE-R
CD-L
CD-R
S-ANALYZER
To / From TAPE SIGNAL Part (Chapter 9-21)
From CD Part (Chapter 9-22)
STBY-AMP
IIC-SDA
IIC-SCL
MUTE
MIC-SENSE
KEY-SENSE
VOCAL-C
KEY-DATA
VOCAL-B
KEY-CLOCK
VOCAL-A
KEY-STROBE
KEY-ON
CLIPPING
NTC
STBY
PWI
To / From TAPE LOGIC / MUP Part (Chapter 9-18)
+5.6V
GND-DIG
+16V
GND-POW
+12V
STBY AMP
R-AUDIO
GND-ANA
L-AUDIO
PWR-DOWN
-30V
4.5V AC
4.5V AC
STBY
CLIPPING
NTC
To / From POWER BOARD (Chapter 11)
To / From KARAOKE BOARD (if available) (Chapter 8)
Used Abbreviations:
NK no Karaoke
NEQ no Equalizer
VCD Video CD
DC-voltages measured in Tuner FM Stereo
EVM

0002	A 7
0003	G 2
0004	A 6
1505	H17
1552	G 2
1553	H 3
1554	J 1
1555	A 2
1556	B11
1557	A 8
1558	A10
1559	A 8
1560	A 3
1561	H16
1829	K20
1830	M 6
1833	H20
1834	N 1
1835	N10
2500	D11
2501	E 7
2502	K 7
2503	F 7
2504	J 7
2505	F 7
2506	J 7
2507	E 7
2508	K 7
2509	E10
2511	E 8
2512	K 8
2513	F 8
2514	J 8
2515	F14
2516	K14
2517	E 8
2518	K 8
2519	F17
2520	J17
2521	L10
2523	I11
2524	I11
2525	F12
2526	J12
2527	E13
2528	I13
2529	G11
2530	K11
2531	G12
2532	K12
2533	E16
2534	L16
2535	E 5
2536	K 3
2537	F 7
2538	L 7
2539	B16
2540	C17
2541	I14
2543	F14
2544	J14
2550	G18
2552	L 9
2553	B15
2555	F 1
2556	K 2
2557	F 1
2558	J 2
2559	F 6
2560	J 5
2561	J 6
2563	A 5
2564	B 5
2565	A 6
2566	B 6
2573	G17
2574	J16
2575	H 1
2576	H 1
2577	C 5
2578	D 5
2579	F 4
2580	J 4
2581	E15
2582	K15
2583	F15
2584	K15
2585	F15
2586	K15
2588	J16
2589	J16
2733	C18
2734	C18
2843	F 3
2844	J 3
3500	H15
3501	E 7
3502	K 7
3503	F 7
3504	K 7
3505	E 6
3506	K 4
3507	E 7
3508	L 8
3509	E14
3510	K14
3511	F 4
3512	J 4
3513	E16
3514	L16
3515	E15
3516	L15
3517	E16
3518	K17
3519	F17
3520	K16
3521	G16
3522	I16
3523	K 9
3524	L 9
3527	F 2
3528	J 2
3529	E15
3530	L15
3531	F 5
3532	J 5
3533	E 8
3534	L 8
3535	K10
3536	K11
3537	B17
3538	B17
3539	B16
3540	G17
3541	E10
3542	C11
3543	F 9
3544	J 9
3545	G18
3546	C11
3547	D 5
3548	K 2
3549	B15
3550	C11
3551	H11
3552	I11
3553	F11
3554	J11
3555	F11
3556	J11
3557	F12
3558	J12
3559	F 1
3560	J 1
3561	H 1
3562	H 1
3563	A 5
3564	B 5
3565	E12
3566	I12
3567	F13
3568	J13
3569	A 5
3570	B 5
3572	B15
3573	F14
3574	K14
3575	F 5
3576	K 5
3577	F 9
3578	J10
3580	J15
3583	G12
3584	K12
3585	F14
3586	K14
3587	C 5
3588	D 5
3589	H14
3590	I14
3591	G12
3592	K12
3593	D 6
3594	L 6
3595	F15
3596	K15
3597	G13
3598	K13
3621	G13
3622	K13
3623	F13
3624	J13
3625	E13
3626	I13
4551	C 4
4552	D 4
4553	C 4
4554	C 4
4555	B16
4580	L 7
4581	E 7
4595	L 1
4596	E 3
4597	K 1
4599	E 3
5501	I 3
5863	A18
6551	F 8
6552	J 8
6553	F 8
6554	K 8
7500	C10
7501	E16
7501	K16
7502	C16
7503	G16
7504	I16
7505	K 9
7507	E 5
7507	K 3
7508	C 3
7509	C 3
7512	G17
7513	F12
7514	J12
7515	G13
7516	K13
7553	F 5

MISCELLANEOUS

	4822 492 71734	SPRING CLIP T0126
1504	4822 134 41176	LAMP
1560	4822 265 20553	CHINCH SOCKET

CAPACITORS

2501©	4822 122 33336	8,2nF	10%	50V
2502©	4822 122 33336	8,2nF	10%	50V
2503	4822 124 41407	0,47µF	20%	63V
2504	4822 124 41407	0,47µF	20%	63V
2505	4822 124 40746	0,22µF	20%	63V
2506	4822 124 40746	0,22µF	20%	63V
2507	4822 121 41738	270nF	5%	63V
2508	4822 121 41738	270nF	5%	63V
2509	4822 124 22263	220µF	20%	25V
2511	5322 121 42661	330nF	5%	63V
2512	5322 121 42661	330nF	5%	63V
2513©	4822 122 32646	5,6nF	10%	50V
2514©	4822 122 32646	5,6nF	10%	50V
2515©	4822 122 33342	33nF	10%	63V
2516©	4822 122 33342	33nF	10%	63V
2517	4822 124 41407	0,47µF	20%	63V
2518	4822 124 41407	0,47µF	20%	63V
2519	4822 124 40433	47µF	20%	25V
2520	4822 124 40433	47µF	20%	25V
2521	4822 124 40196	220µF	20%	16V
2523©	4822 122 33342	33nF	10%	63V
2524©	4822 122 33342	33nF	10%	63V
2525©	4822 122 33891	3,3nF	10%	63V
2526©	4822 122 33891	3,3nF	10%	63V
2527©	4822 126 13296	100nF	10%	16V
2528©	4822 126 13296	100nF	10%	16V
2529	4822 124 41407	0,47µF	20%	63V
2530	4822 124 41407	0,47µF	20%	63V
2531©	4822 122 33219	1,8nF	10%	50V
2532©	4822 122 33219	1,8nF	10%	50V
2533©	5322 122 32448	10pF	5%	50V
2534©	5322 122 32448	10pF	5%	50V
2535©	5322 122 32448	10pF	5%	50V
2536©	5322 122 32448	10pF	5%	50V
2537	4822 122 33195	100pF	10%	50V
2538©	5322 122 32531	100pF	5%	50V
2539©	4822 122 33342	33nF	10%	63V
2540©	4822 122 31797	22nF	10%	63V
2541	4822 124 40433	47µF	20%	25V
2542	4822 122 33519	470pF	10%	50V
2543	4822 124 41407	0,47µF	20%	63V
2544	4822 124 41407	0,47µF	20%	63V
2550	4822 124 40242	1µF	20%	63V
2552	4822 124 41525	100µF	20%	25V
2553©	4822 122 33175	2,2nF	20%	50V
2555	4822 124 40746	0,22µF	20%	63V
2556	4822 124 40746	0,22µF	20%	63V
2557	4822 124 40746	0,22µF	20%	63V
2558	4822 124 40746	0,22µF	20%	63V
2559©	4822 122 33177	10nF	20%	50V
2560	4822 124 40433	47µF	20%	25V
2561	4822 124 40433	47µF	20%	25V
2563	4822 122 33848	47pF	5%	50V
2564	4822 122 33848	47pF	5%	50V
2573©	5322 122 32531	100pF	5%	50V
2574©	5322 122 32531	100pF	5%	50V

CAPACITORS

2579	4822 124 40242	1µF	20%	63V
2580	4822 124 40242	1µF	20%	63V
2581©	5322 122 32531	100pF	5%	50V
2582©	5322 122 32531	100pF	5%	50V
2583©	4822 122 33342	33nF	10%	63V
2584©	4822 122 33342	33nF	10%	63V
2585©	5322 122 32531	100pF	5%	50V
2586©	5322 122 32531	100pF	5%	50V
2588	4822 126 12882	100nF	20%	50V
2589	4822 124 41525	100µF	20%	25V
2590©	4822 122 33177	10nF	20%	50V
2591©	4822 122 33177	10nF	20%	50V
2631©	4822 122 32541	27nF	10%	63V
2632©	4822 122 32541	27nF	10%	63V
2633©	4822 126 13057	220nF	10%	25V
2634©	4822 126 13057	220nF	10%	25V
2635©	4822 122 33891	3,3nF	10%	63V
2636©	4822 122 33891	3,3nF	10%	63V
2637	4822 124 11729	0,68µF	20%	50V
2638	4822 124 11729	0,68µF	20%	50V
2639©	5322 122 32531	100pF	5%	50V
2640©	5322 122 32531	100pF	5%	50V
2641	4822 124 40246	4,7µF	20%	63V
2642	4822 124 40246	4,7µF	20%	63V
2643©	4822 122 33128	15nF	10%	63V
2644©	4822 122 33128	15nF	10%	63V
2645©	5322 122 32448	10pF	5%	50V
2646©	5322 122 32448	10pF	5%	50V
2647	4822 124 40246	4,7µF	20%	63V
2648	4822 124 40246	4,7µF	20%	63V
2691	4822 124 40246	4,7µF	20%	63V
2692	4822 124 41584	100µF	20%	10V
2693	4822 124 41525	100µF	20%	25V
2694	4822 124 41525	100µF	20%	25V
2701	4822 122 33195	100pF	10%	50V
2702	4822 122 33195	100pF	10%	50V
2703	4822 122 33195	100pF	10%	50V
2704	4822 122 33195	100pF	10%	50V
2705©	5322 122 32531	100pF	5%	50V
2706©	5322 122 32531	100pF	5%	50V
2707©	4822 122 33216	270pF	5%	50V
2708©	4822 122 33216	270pF	5%	50V
2709©	5322 122 32531	100pF	5%	50V
2710©	5322 122 32531	100pF	5%	50V
2711	4822 122 33195	100pF	10%	50V
2712	4822 122 33195	100pF	10%	50V
2713	4822 124 41579	10µF	20%	50V
2714	4822 124 41579	10µF	20%	50V
2715	4822 124 41584	100µF	20%	10V
2716	4822 124 41584	100µF	20%	10V
2717	4822 126 12339	2,2nF	10%	16V
2718	4822 126 12339	2,2nF	10%	16V
2719©	4822 122 33893	18nF	10%	63V
2720©	4822 122 33893	18nF	10%	63V
2721©	4822 122 33342	33nF	10%	63V
2722	4822 126 13174	33nF	20%	16V
2723©	4822 126 10326	180pF	5%	
2724©	4822 126 10326	180pF	5%	
2725©	4822 122 33575	220pF	5%	50V
2726©	4822 122 33575	220pF	5%	50V

CAPACITORS

2727	4822 122 10459	560pF	10%	50V
2728©	4822 122 33173	560pF	10%	63V
2729©	4822 122 32541	27nF	10%	63V
2730©	4822 122 32541	27nF	10%	63V
2733	4822 124 41407	0,47µF	20%	63V
2734	4822 124 41407	0,47µF	20%	63V
2735	4822 126 13174	33nF	20%	16V
2737©	4822 126 13838	100nF	10%	50V
2738©	4822 126 13838	100nF	10%	50V
2752©	5322 122 32654	22nF	10%	63V
2760©	4822 122 33342	33nF	10%	63V
2761	4822 124 22263	220µF	20%	25V
2762	4822 124 40246	4,7µF	20%	63V
2763	4822 124 40433	47µF	20%	25V
2765	4822 124 40433	47µF	20%	25V
2780	4822 124 40246	4,7µF	20%	63V
2781	4822 121 51387	10nF	20%	16V
2782©	5322 122 31866	6,8nF	10%	63V
2783	5322 121 42386	100nF	5%	63V
2784	4822 121 43144	22nF	10%	50V
2785	4822 124 41579	10µF	20%	50V
2786	4822 122 33195	100pF	10%	50V
2787©	4822 122 33342	33nF	10%	63V
2794©	4822 126 10002	100nF	20%	50V
2807	4822 126 12339	2,2nF	10%	16V
2831	4822 124 40433	47µF	20%	25V
2832	4822 124 40184	1000µF	20%	10V
2833	4822 124 40433	47µF	20%	25V
2834©	5322 126 10794	220pF	10%	
2835©	5322 126 10794	220pF	10%	
2836©	5322 126 10794	220pF	10%	
2837©	5322 126 10794	220pF	10%	
2838©	5322 126 10794	220pF	10%	
2839©	5322 126 10794	220pF	10%	
2840©	4822 122 33496	100nF	10%	63V
2843	4822 124 41407	0,47µF	20%	63V
2844	4822 124 41407	0,47µF	20%	63V
2845	4822 126 12339	2,2nF	10%	16V
2846	4822 126 12339	2,2nF	10%	16V
2847©	4822 122 33177	10nF	20%	50V
2848	4822 124 40433	47µF	20%	25V
2849	4822 124 40433	47µF	20%	25V
2850©	5322 122 32658	22pF	5%	50V
2851©	5322 122 32654	22nF	10%	63V
2852©	5322 122 32452	47pF	5%	50V
2855	4822 124 40433	47µF	20%	25V
2856©	4822 126 12944	47nF	10%	50V
2853	4822 122 33195	100pF	10%	50V
2859	4822 121 51387	10nF	20%	16V
2860©	4822 122 33891	3,3nF	10%	63V
2862©	4822 122 33891	3,3nF	10%	63V

RESISTORS

3500©	4822 051 20475	4,7MΩ	5%	0,1W
3501©	4822 051 20223	22kΩ	5%	0,1W
3502©	4822 051 20223	22kΩ	5%	0,1W
3503	4822 116 52256	2,2kΩ	5%	0,16W
3504©	4822 117 11449	2,2kΩ	1%	0,1W
3505	4822 116 52234	100kΩ	5%	0,5W
3506©	4822 051 20104	100kΩ	5%	0,1W

RESISTORS

3507	4822 116 52283	4,7kΩ	5%	0,5W
3508©	4822 051 20472	4,7kΩ	5%	0,1W
3509	4822 116 83864	10kΩ	5%	0,5W
3510©	4822 051 20103	10kΩ	5%	0,1W
3511	4822 116 52271	33kΩ	5%	0,16W
3512©	4822 051 20333	33kΩ	5%	0,1W
3513©	4822 051 20154	150kΩ	5%	0,1W
3514©	4822 051 20154	150kΩ	5%	0,1W
3515©	4822 051 20183	18kΩ	5%	0,1W
3516	4822 116 52251	18kΩ	5%	0,5W
3517	4822 116 52175	100Ω	5%	0,5W
3518	4822 116 52195	47Ω	5%	0,5W
3519	4822 116 52195	47Ω	5%	0,5W
3520	4822 116 52175	100Ω	5%	0,5W
3521	4822 050 11002	1kΩ	5%	0,2W
3522©	4822 051 10102	1kΩ	2%	0,25W
3523©	4822 051 20472	4,7kΩ	5%	0,1W
3524©	4822 051 20223	22kΩ	5%	0,1W
3527	4822 050 11002	1kΩ	5%	0,2W
3528©	4822 051 10102	1kΩ	2%	0,25W
3529©	4822 051 20393	39kΩ	5%	0,1W
3530©	4822 051 20393	39kΩ	5%	0,1W
3531	4822 116 52269	3,3kΩ	5%	0,5W
3532©	4822 051 20332	3,3kΩ	5%	0,1W
3533©	4822 051 20562	5,6kΩ	5%	0,1W
3534©	4822 051 20562	5,6kΩ	5%	0,1W
3535	4822 116 52283	4,7kΩ	5%	0,5W
3536	4822 116 52283	4,7kΩ	5%	0,5W
3537©	4822 051 20474	470kΩ	5%	0,1W
3538©	4822 051 20474	470kΩ	5%	0,1W
3539©	4822 051 20225	2,2MΩ	5%	0,1W
3540©	4822 051 20101	100Ω	5%	0,1W
3541	4822 050 11002	1kΩ	5%	0,2W
3543	4822 050 11002	1kΩ	5%	0,2W
3544	4822 050 11002	1kΩ	5%	0,2W
3545©	4822 051 20104	100kΩ	5%	0,1W
3547©	4822 051 20274	270kΩ	5%	0,1W
3548©	4822 051 20274	270kΩ	5%	0,1W
3549©	4822 051 20224	220kΩ	5%	0,1W
3551	4822 116 52289	5,6kΩ	5%	0,16W
3552©	4822 051 20562	5,6kΩ	5%	0,1W
3553	4822 116 52285	470kΩ	5%	0,5W
3554©	4822 051 20474	470kΩ	5%	0,1W
3555©	4822 051 20564	560kΩ	5%	0,1W
3556©	4822 051 20564	560kΩ	5%	0,1W
3557	4822 116 83864	10kΩ	5%	0,5W
3558	4822 116 83864	10kΩ	5%	0,5W
3559	4822 116 52269	3,3kΩ	5%	0,5W
3560	4822 116 52269	3,3kΩ	5%	0,5W
3563	4822 116 83864	10kΩ	5%	0,5W
3564	4822 116 83864	10kΩ	5%	0,5W
3565	4822 116 83864	10kΩ	5%	0,5W
3566	4822 116 83864	10kΩ	5%	0,5W
3567©	4822 051 20562	5,6kΩ	5%	0,1W
3568©	4822 051 20562	5,6kΩ	5%	0,1W
3569	4822 116 52271	33kΩ	5%	0,16W
3570	4822 116 52271	33kΩ	5%	0,16W
3572©	4822 051 20224	220kΩ	5%	0,1W
3573©	4822 051 20103	10kΩ	5%	0,1W
3574©	4822 051 20103	10kΩ	5%	0,1W

RESISTORS

3575	4822 116 52239	120kΩ	5%	0,5W
3576©	4822 051 20124	120kΩ	5%	0,1W
3577	4822 050 11002	1kΩ	5%	0,2W
3578	4822 050 11002	1kΩ	5%	0,2W
3580	4822 052 10339	33Ω	5%	NFR
3583©	4822 051 20562	5,6kΩ	5%	0,1W
3584©	4822 051 20562	5,6kΩ	5%	0,1W
3585©	4822 051 20334	330kΩ	5%	0,1W
3586	4822 116 52272	330kΩ	5%	0,5W
3589	4822 050 11002	1kΩ	5%	0,2W
3590©	4822 051 20103	10kΩ	5%	0,1W
3591©	4822 051 20562	5,6kΩ	5%	0,1W
3592©	4822 051 20562	5,6kΩ	5%	0,1W
3593	4822 116 52224	470Ω	5%	0,5W
3594	4822 116 52224	470Ω	5%	0,5W
3595	4822 116 52272	330kΩ	5%	0,5W
3596	4822 116 52272	330kΩ	5%	0,5W
3597©	4822 051 20562	5,6kΩ	5%	0,1W
3598©	4822 051 20562	5,6kΩ	5%	0,1W
3600	4822 116 52284	47kΩ	5%	0,5W
3601	4822 116 52235	1MΩ	5%	0,5W
3605©	4822 051 20103	10kΩ	5%	0,1W
3606©	4822 051 20473	47kΩ	5%	0,1W
3607©	4822 051 20473	47kΩ	5%	0,1W
3609©	4822 051 20103	10kΩ	5%	0,1W
3619©	4822 051 20008	CHIP JUMPER 0805		
3619©	4822 051 20153	15kΩ	5%	0,1W
3620©	4822 051 20008	CHIP JUMPER 0805		
3620©	4822 051 20472	4,7kΩ	5%	0,1W
3621	4822 116 52283	4,7kΩ	5%	0,5W
3622	4822 116 52283	4,7kΩ	5%	0,5W
3623©	4822 051 20223	22kΩ	5%	0,1W
3624	4822 116 52257	22kΩ	5%	0,5W
3625©	4822 051 20103	10kΩ	5%	0,1W
3626©	4822 051 20103	10kΩ	5%	0,1W
3631	4822 116 52284	47kΩ	5%	0,5W
3632	4822 116 52284	47kΩ	5%	0,5W
3633©	4822 051 20682	6,8kΩ	5%	0,1W
3634©	4822 051 20682	6,8kΩ	5%	0,1W
3635	4822 100 20166	10kΩ TRIMPOT.		
3636	4822 100 20166	10kΩ TRIMPOT.		
3637	4822 116 52284	47kΩ	5%	0,5W
3638©	4822 051 20473	47kΩ	5%	0,1W
3639©	4822 051 20562	5,6kΩ	5%	0,1W
3640©	4822 051 20562	5,6kΩ	5%	0,1W
3641	4822 100 20166	10kΩ TRIMPOT.		
3642	4822 100 20166	10kΩ TRIMPOT.		
3643	4822 116 52284	47kΩ	5%	0,5W
3644©	4822 051 20473	47kΩ	5%	0,1W
3645©	4822 051 20393	39kΩ	5%	0,1W
3646	4822 116 83882	39kΩ	5%	0,5W
3647©	4822 051 20332	3,3kΩ	5%	0,1W
3648©	4822 051 20332	3,3kΩ	5%	0,1W
3649©	4822 051 20562	5,6kΩ	5%	0,1W
3650©	4822 051 20562	5,6kΩ	5%	0,1W
3651©	4822 051 10102	1kΩ	2%	0,25W
3652©	4822 051 10102	1kΩ	2%	0,25W
3653	4822 050 11002	1kΩ	5%	0,2W
3654	4822 050 11002	1kΩ	5%	0,2W
3655	4822 100 20166	10kΩ TRIMPOT.		

RESISTORS

3656	4822 100 20166	10kΩ TRIMPOT.		
3657©	4822 051 10102	1kΩ	2%	0,25W
3658©	4822 051 10102	1kΩ	2%	0,25W
3659©	4822 051 20333	33kΩ	5%	0,1W
3660	4822 116 52271	33kΩ	5%	0,16W
3661©	4822 051 20334	330kΩ	5%	0,1W
3662©	4822 051 20334	330kΩ	5%	0,1W
3663	4822 116 52252	180kΩ	5%	0,5W
3664	4822 116 52252	180kΩ	5%	0,5W
3665©	4822 117 11149	82kΩ	1%	0,1W
3666©	4822 117 11149	82kΩ	1%	0,1W
3671	4822 050 11002	1kΩ	5%	0,2W
3672	4822 116 52234	100kΩ	5%	0,5W
3673©	4822 051 10102	1kΩ	2%	0,25W
3674©	4822 051 10102	1kΩ	2%	0,25W
3675©	4822 051 10102	1kΩ	2%	0,25W
3676©	4822 051 10102	1kΩ	2%	0,25W
3677©	4822 051 20473	47kΩ	5%	0,1W
3678©	4822 051 10102	1kΩ	2%	0,25W
3679	4822 116 52284	47kΩ	5%	0,5W
3680©	4822 051 20472	4,7kΩ	5%	0,1W
3681	4822 116 52283	4,7kΩ	5%	0,5W
3682	4822 100 20166	10kΩ TRIMPOT.		
3683©	4822 051 20562	5,6kΩ	5%	0,1W
3684	4822 100 20166	10kΩ TRIMPOT.		
3685©	4822 051 20472	4,7kΩ	5%	0,1W
3686	4822 116 52284	47kΩ	5%	0,5W
3687	4822 116 52224	470Ω	5%	0,5W
3688	4822 116 52234	100kΩ	5%	0,5W
3689©	4822 051 20104	100kΩ	5%	0,1W
3690	4822 116 83864	10kΩ	5%	0,5W
3691	4822 116 83864	10kΩ	5%	0,5W
3692©	4822 117 11746	43kΩ	1%	0,1W
3693©	4822 051 20689	68Ω	5%	0,1W
3694	4822 052 10109	10Ω	5%	NFR
3695©	4822 051 20689	68Ω	5%	0,1W
3701©	4822 051 20221	220Ω	5%	0,1W
3702©	4822 051 20221	220Ω	5%	0,1W
3703©	4822 051 20221	220Ω	5%	0,1W
3704©	4822 051 20221	220Ω	5%	0,1W
3705	4822 116 83872	220Ω	5%	0,5W
3706	4822 116 83872	220Ω	5%	0,5W
3707©	4822 051 20101	100Ω	5%	0,1W
3708©	4822 051 20101	100Ω	5%	0,1W
3709©	4822 051 20229	22Ω	5%	0,1W
3710©	4822 051 20229	22Ω	5%	0,1W
3711©	4822 051 20184	180kΩ	5%	0,1W
3712©	4822 051 20184	180kΩ	5%	0,1W
3713©	4822 051 20109	10Ω	5%	0,1W
3714©	4822 051 20109	10Ω	5%	0,1W
3715	4822 116 52249	1,8kΩ	5%	0,16W
3716©	4822 051 20182	1,8kΩ	5%	0,1W
3717	4822 116 52276	3,9kΩ	5%	0,5W
3718	4822 116 52276	3,9kΩ	5%	0,5W
3719©	4822 117 11383	12kΩ	1%	0,1W
3720©	4822 117 11383	12kΩ	1%	0,1W
3721©	4822 051 20562	5,6kΩ	5%	0,1W
3722©	4822 051 20562	5,6kΩ	5%	0,1W
3723	4822 116 52238	12kΩ	5%	0,5W
3724©	4822 117 11383	12kΩ	1%	0,1W

RESISTORS

3725©	4822 051 20224	220kΩ	5%	0,1W
3726©	4822 051 20224	220kΩ	5%	0,1W
3727©	4822 051 20562	5,6kΩ	5%	0,1W
3728©	4822 051 20562	5,6kΩ	5%	0,1W
3729©	4822 051 20272	2,7kΩ	5%	0,1W
3730©	4822 051 20272	2,7kΩ	5%	0,1W
3731©	4822 051 20682	6,8kΩ	5%	0,1W
3732©	4822 051 20682	6,8kΩ	5%	0,1W
3733	4822 116 83872	220Ω	5%	0,5W
3734©	4822 051 20221	220Ω	5%	0,1W
3735	4822 116 52251	18kΩ	5%	0,5W
3736	4822 116 52251	18kΩ	5%	0,5W
3737©	4822 051 20332	3,3kΩ	5%	0,1W
3738	4822 116 52269	3,3kΩ	5%	0,5W
3739©	4822 051 20121	120Ω	5%	0,1W
3740	4822 116 52284	47kΩ	5%	0,5W
3741	4822 050 11002	1kΩ	5%	0,2W
3742	4822 116 52234	100kΩ	5%	0,5W
3744©	4822 051 20153	15kΩ	5%	0,1W
3745©	4822 051 10102	1kΩ	2%	0,25W
3746©	4822 051 10102	1kΩ	2%	0,25W
3747©	4822 051 20104	100kΩ	5%	0,1W
3749©	4822 051 10102	1kΩ	2%	0,25W
3759	4822 050 11002	1kΩ	5%	0,2W
3760©	4822 051 20104	100kΩ	5%	0,1W
3761	4822 116 83864	10kΩ	5%	0,5W
3762©	4822 051 20821	820Ω	5%	0,1W
3763©	4822 051 20184	180kΩ	5%	0,1W
3764©	4822 051 20471	470Ω	5%	0,1W
3765	4822 116 52284	47kΩ	5%	0,5W
3766©	4822 051 20475	4,7MΩ	5%	0,1W
3767©	4822 051 20223	22kΩ	5%	0,1W
3768	4822 116 52285	470kΩ	5%	0,5W
3769©	4822 051 20475	4,7MΩ	5%	0,1W
3770	4822 116 52243	1,5kΩ	5%	0,16W
3771©	4822 051 10102	1kΩ	2%	0,25W
3772©	4822 051 20183	18kΩ	5%	0,1W
3773	4822 100 20166	10kΩ TRIMPOT.		
3774©	4822 051 20223	22kΩ	5%	0,1W
3775	4822 116 52186	22Ω	5%	0,5W
3776	4822 116 52296	6,8kΩ	5%	0,5W
3777	4822 116 83868	150Ω	5%	0,5W
3778©	4822 051 20828	8,2Ω	5%	0,1W
3779©	4822 051 20334	330kΩ	5%	0,1W
3780©	4822 051 20105	1MΩ	5%	0,1W
3781©	4822 051 20475	4,7MΩ	5%	0,1W
3782©	4822 051 20472	4,7kΩ	5%	0,1W
3783©	4822 051 20472	4,7kΩ	5%	0,1W
3784©	4822 051 20153	15kΩ	5%	0,1W
3785	4822 100 11163	100kΩ TRIMPOT LIN.		
3786	4822 116 52256	2,2kΩ	5%	0,16W
3787©	4822 051 20105	1MΩ	5%	0,1W
3788	4822 116 52235	1MΩ	5%	0,5W
3789	4822 116 52257	22kΩ	5%	0,5W
3795©	4822 051 20103	10kΩ	5%	0,1W
3796	4822 050 11002	1kΩ	5%	0,2W
3797	4822 116 52234	100kΩ	5%	0,5W
3798	4822 116 52175	100Ω	5%	0,5W
3811©	4822 051 10102	1kΩ	2%	0,25W
3841	4822 116 52176	10Ω	5%	0,5W

RESISTORS

3842©	4822 051 20221	220Ω	5%	0,1W
3843©	4822 051 20221	220Ω	5%	0,1W
3844©	4822 051 20221	220Ω	5%	0,1W
3845	4822 116 83864	10kΩ	5%	0,5W
3846	4822 116 83864	10kΩ	5%	0,5W
3847	4822 116 83864	10kΩ	5%	0,5W
3848	4822 116 83864	10kΩ	5%	0,5W
3849©	4822 117 11449	2,2kΩ	1%	0,1W
3851©	4822 051 20103	10kΩ	5%	0,1W
3852©	4822 051 20103	10kΩ	5%	0,1W
3855	4822 116 52256	2,2kΩ	5%	0,16W
3856©	4822 051 20223	22kΩ	5%	0,1W
3857	4822 116 83864	10kΩ	5%	0,5W
3858	4822 116 83864	10kΩ	5%	0,5W
3859©	4822 051 20229	22Ω	5%	0,1W
3860©	4822 051 20101	100Ω	5%	0,1W
3861©	4822 051 20103	10kΩ	5%	0,1W
3862©	4822 051 20105	1MΩ	5%	0,1W
3863	4822 116 52176	10Ω	5%	0,5W
3864©	4822 051 20229	22Ω	5%	0,1W
3865©	4822 051 20103	10kΩ	5%	0,1W
3866	4822 116 52219	330Ω	5%	0,5W
3867©	4822 051 20221	220Ω	5%	0,1W
3868	4822 116 52176	10Ω	5%	0,5W
3869©	4822 051 20103	10kΩ	5%	0,1W
3870	4822 116 52243	1,5kΩ	5%	0,16W
3871	4822 116 52186	22Ω	5%	0,5W
3872©	4822 117 11449	2,2kΩ	1%	0,1W
3873	4822 116 90835	7x10kΩ RES.NETWORK		
3874©	4822 051 20103	10kΩ	5%	0,1W
3875	4822 116 52243	1,5kΩ	5%	0,16W
3876©	4822 117 11139	1,5kΩ	1%	0,1W
3877©	4822 117 11449	2,2kΩ	1%	0,1W
3878©	4822 051 20105	1MΩ	5%	0,1W
3879©	4822 051 20154	150kΩ	5%	0,1W
3880©	4822 051 20393	39kΩ	5%	0,1W
3881©	4822 051 20333	33kΩ	5%	0,1W
3882©	4822 051 10102	1kΩ	2%	0,25W
3883©	4822 051 20122	1,2kΩ	5%	0,1W
3884©	4822 051 10102	1kΩ	2%	0,25W
3885©	4822 051 10102	1kΩ	2%	0,25W
3887	4822 116 52289	5,6kΩ	5%	0,16W
3891	4822 052 10338	3,3Ω		NFR
3895	4822 116 52264	27kΩ	5%	0,5W
3896	4822 116 52251	18kΩ	5%	0,5W
3897	4822 116 52251	18kΩ	5%	0,5W
3898	4822 116 83882	39kΩ	5%	0,5W
3899	4822 116 83882	39kΩ	5%	0,5W
4500©	4822 051 20008	CHIP JUMPER 0805		
4501©	4822 051 10008	CHIP JUMPER 1206		
4502©	4822 051 10008	CHIP JUMPER 1206		
4503©	4822 051 10008	CHIP JUMPER 1206		
4506©	4822 051 10008	CHIP JUMPER 1206		
4510©	4822 051 10008	CHIP JUMPER 1206		
4511©	4822 051 10008	CHIP JUMPER 1206		
4516©	4822 051 10008	CHIP JUMPER 1206		
4517©	4822 051 10008	CHIP JUMPER 1206		
4518©	4822 051 10008	CHIP JUMPER 1206		
4520©	4822 051 20008	CHIP JUMPER 0805		
4521©	4822 051 10008	CHIP JUMPER 1206		

RESISTORS

4523©	4822 051 10008	CHIP JUMPER 1206		
4524©	4822 051 10008	CHIP JUMPER 1206		
4525©	4822 051 10008	CHIP JUMPER 1206		
4526©	4822 051 10008	CHIP JUMPER 1206		
4527©	4822 051 10008	CHIP JUMPER 1206		
4529©	4822 051 10008	CHIP JUMPER 1206		
4530©	4822 051 10008	CHIP JUMPER 1206		
4531©	4822 051 20008	CHIP JUMPER 0805		
4533©	4822 051 20008	CHIP JUMPER 0805		
4534©	4822 051 10008	CHIP JUMPER 1206		
4535©	4822 051 10008	CHIP JUMPER 1206		
4536©	4822 051 10008	CHIP JUMPER 1206		
4537©	4822 051 10008	CHIP JUMPER 1206		
4538©	4822 051 10008	CHIP JUMPER 1206		
4540©	4822 051 10008	CHIP JUMPER 1206		
4541©	4822 051 20008	CHIP JUMPER 0805		
4542©	4822 051 10008	CHIP JUMPER 1206		
4543©	4822 051 10008	CHIP JUMPER 1206		
4545©	4822 051 10008	CHIP JUMPER 1206		
4546©	4822 051 10008	CHIP JUMPER 1206		
4547©	4822 051 10008	CHIP JUMPER 1206		
4548©	4822 051 10008	CHIP JUMPER 1206		
4549©	4822 051 10008	CHIP JUMPER 1206		
4550©	4822 051 20008	CHIP JUMPER 0805		
4555	4822 116 52283	4,7kΩ	5%	0,5W
4557©	4822 051 10008	CHIP JUMPER 1206		
4559©	4822 051 10008	CHIP JUMPER 1206		
4565©	4822 051 20008	CHIP JUMPER 0805		
4566©	4822 051 10008	CHIP JUMPER 1206		
4568©	4822 051 10008	CHIP JUMPER 1206		
4572©	4822 051 10008	CHIP JUMPER 1206		
4574©	4822 051 10008	CHIP JUMPER 1206		
4577©	4822 051 20008	CHIP JUMPER 0805		
4578©	4822 051 10008	CHIP JUMPER 1206		
4579©	4822 051 20008	CHIP JUMPER 0805		
4595©	4822 051 20008	CHIP JUMPER 0805		
4596©	4822 051 20008	CHIP JUMPER 0805		
4597©	4822 051 10008	CHIP JUMPER 1206		
4599©	4822 051 20008	CHIP JUMPER 0805		
4630	4822 050 11002	1kΩ	5%	0,2W
4631©	4822 051 20103	10kΩ	5%	0,1W
4632©	4822 051 10102	1kΩ	2%	0,25W
4633©	4822 051 10102	1kΩ	2%	0,25W
4634©	4822 051 10102	1kΩ	2%	0,25W
4635©	4822 051 10102	1kΩ	2%	0,25W
4636©	4822 051 10102	1kΩ	2%	0,25W
4637©	4822 051 10102	1kΩ	2%	0,25W
4638©	4822 051 10102	1kΩ	2%	0,25W
4639©	4822 051 10102	1kΩ	2%	0,25W
4640©	4822 051 10102	1kΩ	2%	0,25W
4641©	4822 051 10102	1kΩ	2%	0,25W
4642©	4822 051 10102	1kΩ	2%	0,25W
4643©	4822 051 10102	1kΩ	2%	0,25W
4644©	4822 051 10102	1kΩ	2%	0,25W
4645©	4822 051 10102	1kΩ	2%	0,25W
4646©	4822 051 10102	1kΩ	2%	0,25W
4647©	4822 051 10102	1kΩ	2%	0,25W
4648©	4822 051 10102	1kΩ	2%	0,25W
4649©	4822 051 10102	1kΩ	2%	0,25W
4650©	4822 051 10102	1kΩ	2%	0,25W

RESISTORS

4651©	4822 051 10102	1kΩ	2%	0,25W
4652©	4822 051 10102	1kΩ	2%	0,25W
4653©	4822 051 20473	47kΩ	5%	0,1W
4654	4822 050 11002	1kΩ	5%	0,2W
4655	4822 050 11002	1kΩ	5%	0,2W
4656	4822 050 11002	1kΩ	5%	0,2W
4657	4822 050 11002	1kΩ	5%	0,2W
4658©	4822 051 10102	1kΩ	2%	0,25W
4659©	4822 051 20221	220Ω	5%	0,1W
4660©	4822 051 10102	1kΩ	2%	0,25W
4661©	4822 051 10102	1kΩ	2%	0,25W
4662©	4822 051 20472	4,7kΩ	5%	0,1W
4663©	4822 051 20472	4,7kΩ	5%	0,1W
4664©	4822 117 11449	2,2kΩ	1%	0,1W
4665©	4822 051 20103	10kΩ	5%	0,1W
4666©	4822 117 11449	2,2kΩ	1%	0,1W
4667©	4822 051 20472	4,7kΩ	5%	0,1W
4668	4822 050 11002	1kΩ	5%	0,2W
4670©	4822 051 20103	10kΩ	5%	0,1W
4671	4822 050 11002	1kΩ	5%	0,2W
4672	4822 050 11002	1kΩ	5%	0,2W
4673	4822 050 11002	1kΩ	5%	0,2W
4674©	4822 051 10102	1kΩ	2%	0,25W
4675©	4822 051 20273	27kΩ	5%	0,1W
4676©	4822 051 10102	1kΩ	2%	0,25W
4677	4822 050 11002	1kΩ	5%	0,2W
4678©	4822 051 10102	1kΩ	2%	0,25W
4679	4822 050 11002	1kΩ	5%	0,2W
4680	4822 050 11002	1kΩ	5%	0,2W
4681©	4822 051 20472	4,7kΩ	5%	0,1W
4682©	4822 051 10102	1kΩ	2%	0,25W
4683©	4822 051 20103	10kΩ	5%	0,1W
4684	4822 116 52256	2,2kΩ	5%	0,16W
4685	4822 116 52256	2,2kΩ	5%	0,16W
4686	4822 050 11002	1kΩ	5%	0,2W
4687©	4822 051 20472	4,7kΩ	5%	0,1W
4688©	4822 051 20223	22kΩ	5%	0,1W
4689©	4822 051 10102	1kΩ	2%	0,25W
4690©	4822 051 20471	470Ω	5%	0,1W
4691©	4822 051 20472	4,7kΩ	5%	0,1W
4692	4822 050 11002	1kΩ	5%	0,2W
4693	4822 116 52239	120kΩ	5%	0,5W
4694©	4822 051 10102	1kΩ	2%	0,25W
4695	4822 050 11002	1kΩ	5%	0,2W
4696©	4822 051 20221	220Ω	5%	0,1W
4697©	4822 051 10102	1kΩ	2%	0,25W
4698©	4822 051 20221	220Ω	5%	0,1W
4699©	4822 051 20221	220Ω	5%	0,1W
4700©	4822 051 20221	220Ω	5%	0,1W
4701©	4822 051 10102	1kΩ	2%	0,25W
4702©	4822 051 20008	CHIP JUMPER 0805		
4703©	4822 051 10102	1kΩ	2%	0,25W
4704©	4822 051 10102	1kΩ	2%	0,25W
4705©	4822 051 10008	CHIP JUMPER 1206		
4707	4822 050 11002	1kΩ	5%	0,2W
4708	4822 050 11002	1kΩ	5%	0,2W
4709	4822 050 11002	1kΩ	5%	0,2W
4710©	4822 051 10102	1kΩ	2%	0,25W
4711©	4822 051 10102	1kΩ	2%	0,25W
4712©	4822 051 10102	1kΩ	2%	0,25W

RESISTORS

4713©	4822 051 10102	1kΩ	2%	0,25W
4716©	4822 051 10102	1kΩ	2%	0,25W
4718©	4822 051 20103	10kΩ	5%	0,1W
4719©	4822 051 20103	10kΩ	5%	0,1W
4720	4822 116 52278	390kΩ	5%	0,5W
4721©	4822 051 20104	100kΩ	5%	0,1W
4801©	4822 051 20008	CHIP JUMPER 0805		
4802©	4822 051 20008	CHIP JUMPER 0805		
4803©	4822 051 10008	CHIP JUMPER 1206		
4804©	4822 051 10008	CHIP JUMPER 1206		
4805©	4822 051 10008	CHIP JUMPER 1206		
4896©	4822 051 20008	CHIP JUMPER 0805		
4898©	4822 051 20008	CHIP JUMPER 0805		

COILS

5501	4822 157 50964	100μH
5631	4822 156 21725	MPX FILTER
5632	4822 156 21725	MPX FILTER
5701	4822 156 20946	OSC.COIL 100kHz
5790	4822 156 21721	2,2μH
5791	5322 242 73697	CERAMIC RES. 8MHz
5860	4822 242 81865	CER. RES. 16,93MHz
5862	4822 156 21721	2,2μH
5863	4822 157 50964	100μH

DIODES

6551©	5322 130 34337	BAV99
6552©	5322 130 34337	BAV99
6553©	5322 130 34337	BAV99
6554©	5322 130 34337	BAV99
6651	4822 130 30621	1N4148
6760	4822 130 34382	BZX79-C8V2
6761	4822 130 30621	1N4148
6762	4822 130 30621	1N4148
6772	4822 130 30621	1N4148
6773	4822 130 30621	1N4148
6774	4822 130 30621	1N4148
6775	4822 130 30621	1N4148
6776	4822 130 30621	1N4148
6777	4822 130 34382	BZX79-C8V2
6778	4822 130 30621	1N4148
6790	5322 130 30684	1N4002
6791	5322 130 30684	1N4002
6792	4822 130 30621	1N4148
6857	4822 130 34167	BZX79-B6V2

TRANSISTORS

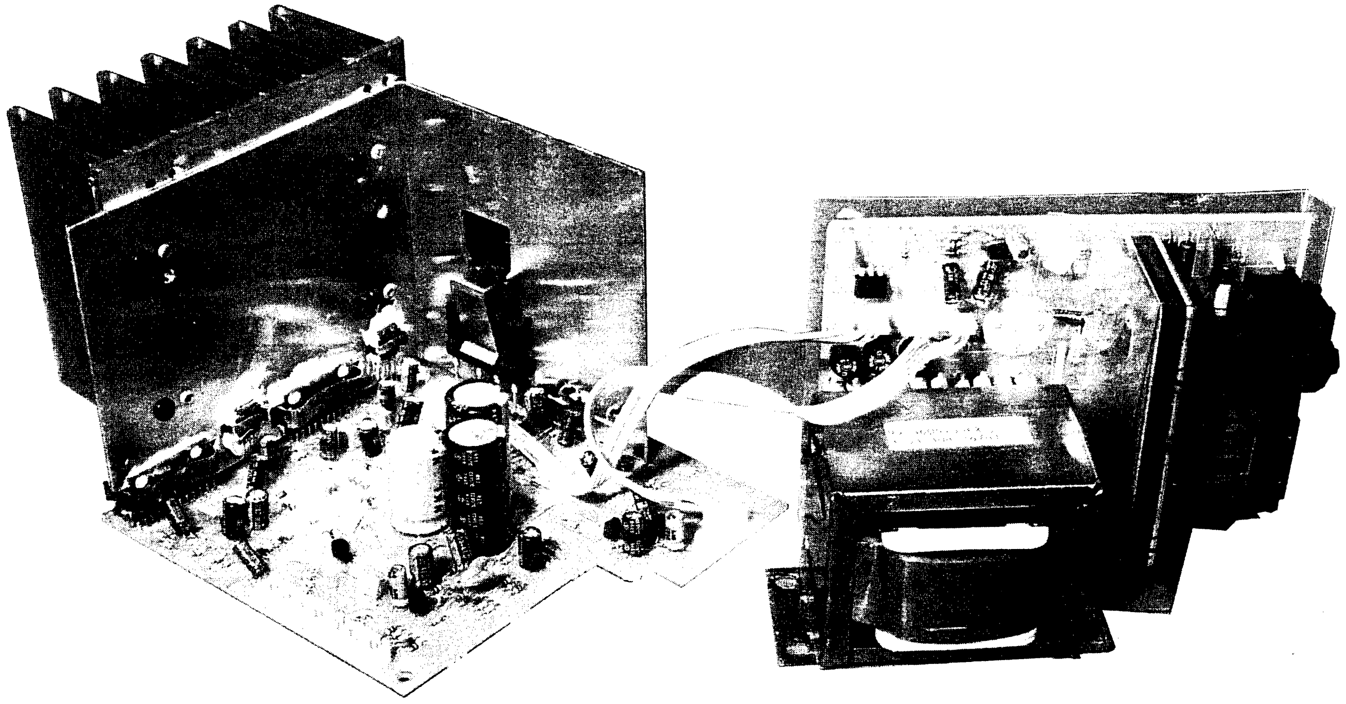
7001	4822 130 40982	BD437
7502©	5322 130 42136	BC848C
7503©	4822 130 42615	BC817-40
7504©	4822 130 42615	BC817-40
7505©	5322 130 42136	BC848C
7512©	4822 130 42513	BC858C
7513©	5322 130 42136	BC848C
7514©	5322 130 42136	BC848C
7515©	5322 130 42136	BC848C
7516©	5322 130 42136	BC848C
7631©	5322 130 42136	BC848C
7632©	5322 130 42136	BC848C
7633©	5322 130 42136	BC848C
7634©	5322 130 42136	BC848C

TRANSISTORS

7650©	5322 130 42136	BC848C
7651©	4822 130 42513	BC858C
7652©	5322 130 42136	BC848C
7653©	5322 130 60123	BC807-40
7654©	5322 130 42136	BC848C
7655©	5322 130 60123	BC807-40
7661©	5322 130 60123	BC807-40
7662©	5322 130 42136	BC848C
7663	4822 130 40982	BD437
7701©	5322 130 42136	BC848C
7780©	5322 130 42136	BC848C
7781©	5322 130 42136	BC848C
7782	4822 130 41715	BC328-40
7783©	5322 130 42136	BC848C
7784©	4822 130 60373	BC856B
7785	4822 130 63494	J111
7786	4822 130 63494	J111
7787©	4822 130 42513	BC858C
7788©	4822 130 42513	BC858C
7820©	4822 130 42615	BC817-40
7851©	5322 130 42136	BC848C
7856©	5322 130 42136	BC848C

INTEGRATED CIRCUITS

7501©	4822 209 31378	NJM4556M
7507©	4822 209 83357	NJM4560M
7553©	4822 209 33652	TEA6321T/V1
7630©	4822 209 90406	CXA1101M
7640©	4822 209 83357	NJM4560M
7690©	4822 209 13587	TMP87CM71F
7710©	4822 209 32919	HEF4952BT
7720©	4822 209 32918	AN7318S, Rec/Pb-AMPLIFIER IC
7730©	4822 209 32919	HEF4952BT
7740©	4822 209 32919	HEF4952BT
7850©	4822 209 31064	TDA1301T/N1, DSIC2
7860©	4822 209 33339	SAA7345GP/M5, DECODER
7861©	4822 209 32196	TDA1311AT/N2, DAC
7862	4822 209 32852	TDA7073A/N2
7863©	4822 209 31519	TDA7072A



POWER BOARD

Layout stage .8

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CIRCUIT DESCRIPTION

The mains transformer 1008 is fed with a preregulated voltage. The preregulation is done by a power MOSFET 7351. To be able to handle AC, the voltage for the FET is rectified by a diode bridge 6351, 6352, 6353 and 6354. The control of the MOSFET is depending of the mode of the set.

In Power on mode the MOSFET is controled by the optocoupler 7353 via resistor 3345. The supply for the optocoupler is created via resistor 3343 and the diode 6344. Stabilisation and filtering is done by the zenerdiode 6345 and the elcap 2343. The optocoupler is activated by the transistor 7369. The emitter of this transistor is connected to the stabilized voltage +5,6V via resistor 3386. The base is connected via zenerdiode 6384 and resistor 3383 to the voltage +16V. This enables the transistor to compare the voltage +16V with the voltage +5,6V. In case of a too low +16V the transistor conducts and makes via the optocoupler also the MOSFET conducting. In case of a too high +16V both semiconductors become nonconducting.

To provide sufficient stability in the whole control loop, some measures are taken. On the primary side a feed back via resistor 3341 and diode 6341 reduces the overall gain. On the secondary side the resistor 3386 works in similar way. The RC network 2379/3379 reduces the AC gain while the DC gain remains unaffected.

Transients could cause too high current peaks in the FET. To safeguard the FET, the current is sensed by the resistor 3344 and the transistor 7341. In case of overcurrent the thyristor 7342 fires via transistor 7342 and bypasses the FET.

High voltages on the FET are sensed via voltage-divider (3341&4436) and (3340 parallel 3342) and will trigger 7341. High voltages in combination with high current, sensed by 3357 and 3344 will trigger the thyristor 7352 to bypass 7351.

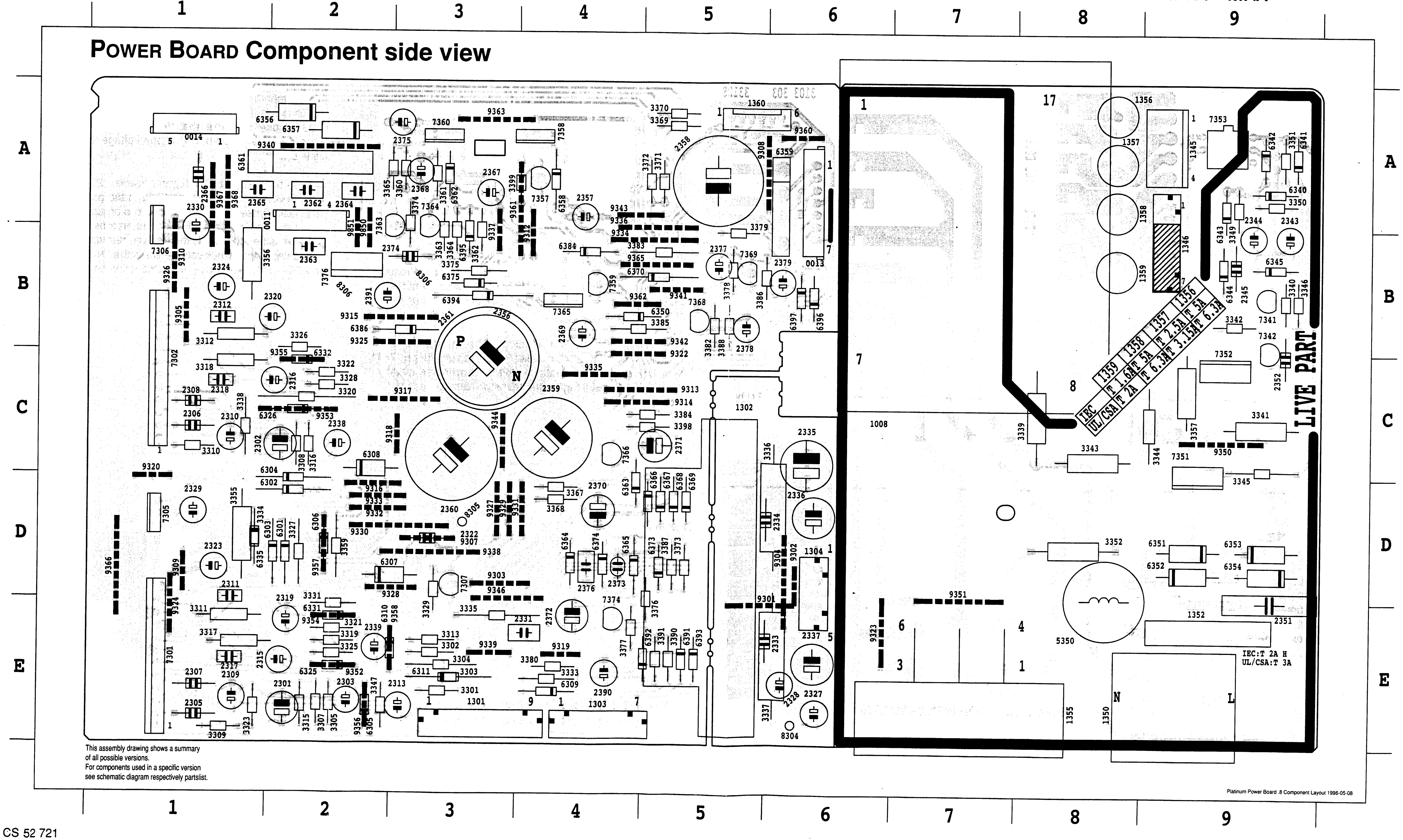
To avoid a too high supply in case of fault condition the thyristor 7376 is used as a crowbar device. The zenerdiode 6386 senses the voltage +24V and fires the thyristor in case of excessive voltage. The fuses will be blown.

In the ECO mode (Stand by and display off) it is only necessary to supply the microprocessor and the infrared eye. This can be done with a drastically reduced voltage on the transformer. To activate that mode, the line STBY is switched by the microprocessor to ground. This makes the transistor 7366 conducting. As a consequence the +12V stabilisation, realized by transistors 7360, 7363 and 7364, is switched off. Additional the transistor 7368 is conducting and switches transistor 7369 off. The control loop via the optocoupler is now cut off. The control is working only with components connected to the primary side of the transformer. Via the diode 6344 still a stabilized voltage of 12V is created. The voltage at the anode of the diode 6344 is during one half cycle about +12V and during the other half cycle below zero depending on the voltage across the transformer.

Integration by resistor 3349 and capacitor 2344 results a triangle voltage, fed via diode 6342 to the gate of the FET. The positive peak happens at the zero crossing of the mains, switching on the FET for a short time. The average DC level is depending on the transformer voltage. Increasing transformer voltage shifts the DC level to negative. This is reducing the conduction time of the FET.

0011	A	2
0013	A	6
0014	A	1
1008	B	7
1301	E	3
1302	D	5
1303	E	4
1304	D	6
1345	A	9
1346	B	9
1350	E	9
1352	E	9
1355	E	7
1356	A	8
1357	A	8
1358	A	8
1359	B	8
1360	A	5
2301	E	2
2302	C	2
2303	E	2
2305	E	1
2306	C	1
2307	E	1
2308	C	1
2309	E	1
2310	C	1
2311	E	1
2312	B	1
2313	E	3
2315	E	2
2316	C	2
2317	E	1
2318	C	1
2319	E	2
2320	B	2
2322	D	3
2323	D	1
2324	B	1
2327	E	6
2328	E	6
2329	D	1
2330	B	1
2331	E	4
2333	E	5
2334	D	5
2335	C	6
2336	D	6
2337	E	6
2338	C	2
2339	E	2
2343	B	9
2344	B	9
2345	B	9
2351	E	9
2352	C	9
2356	C	3
2357	A	4
2358	A	5
2359	C	4
2360	C	3
2361	C	3
2362	A	2
2363	B	2
2364	A	2
2365	A	1
2366	A	1
2367	A	3
2368	A	3
2369	B	4
2370	D	4
2371	C	5
2372	E	4
2373	D	4
2374	B	3
2375	A	3
2376	D	4
2377	B	5
2378	B	5
2379	B	6
2390	E	4
2391	B	2
3301	E	3
3302	E	3
3303	E	3
3304	E	3
3305	E	2
3307	E	2
3308	C	2
3309	E	1
3310	C	1
3311	E	1
3312	B	1
3313	E	3
3315	E	2
3316	C	2
3317	E	1
3318	C	1
3319	E	2
3320	C	2
3321	E	2
3322	C	2
3323	E	1
3325	E	2
3326	B	2
3327	D	2
3328	C	2
3329	D	3
3331	E	2
3333	E	4
3334	D	1
3335	E	3
3336	D	6
3337	E	6
3338	C	1
3339	C	8
3340	B	9
3341	C	9
3342	B	9
3343	C	8
3344	C	9
3345	C	9
3346	B	9
3347	E	2
3349	A	9
3350	A	9
3351	A	9
3352	D	8
3355	D	1
3356	B	1
3357	C	9
3359	D	2
3360	A	3
3361	A	3
3362	B	3
3363	B	3
3364	B	3
3365	A	2
3367	D	4
3368	D	4
3369	A	5
3370	A	5
3371	A	5
3372	A	5
3373	D	5
3374	A	3
3375	B	3
3376	D	5
3377	E	4
3378	B	5
3379	B	5
3380	E	4
3382	B	5
3383	B	5
3384	C	5
3385	B	4
3386	B	5
3387	D	5
3388	B	5
3390	E	5
3391	E	5
3398	C	5
3399	A	4
5350	D	8
6301	D	2
6302	D	2
6303	D	2
6304	D	2
6305	E	2
6306	D	2
6307	D	2
6308	C	2
6309	E	4
6310	E	2
6311	E	3
6325	E	2
6326	C	2
6331	E	2
6332	C	2
6335	D	1
6340	A	9
6341	A	9
6342	A	9
6343	A	9
6344	B	9
6345	B	9
6350	B	4
6351	D	9
6352	D	9
6353	D	9
6354	D	9
6356	A	2
6357	A	2
6358	A	4
6359	A	6
6361	A	2
6362	A	3
6363	D	4
6364	D	4
6365	D	4
6366	D	5
6367	D	5
6368	D	5
6369	D	5
6370	B	5
6373	D	5
6374	D	4
6375	B	3
6384	B	4
6386	B	3
6391	E	5
6392	E	5
6393	E	5
6394	B	3
6395	B	3
6396	B	6
6397	B	6
7301	E	1
7302	C	1
7305	D	1
7306	B	1
7307	D	3
7341	B	9
7342	B	9
7351	C	9
7352	C	9
7353	A	9
7357	A	4
7358	A	4
7359	B	4
7360	A	3
7363	B	2
7364	B	3
7365	B	4
7366	C	4
7368	B	5
7369	B	5
7374	E	4
7376	B	2
8304	E	6
8305	D	3
8306	B	2
9301	E	5
9302	D	6
9303	D	3
9304	D	6
9305	B	1
9307	D	3
9308	A	5
9309	D	1
9310	B	1
9312	B	4
9313	C	4
9314	C	4
9315	B	3
9316	D	2
9317	C	3
9318	C	3
9319	E	4
9320	D	1
9322	C	4
9323	E	6
9324	E	1
9325	B	3
9326	B	1
9327	D	3
9328	D	2
9329	D	3
9330	D	3
9331	D	4
9332	D	2
9333	D	2
9334	B	5
9335	C	4
9336	B	5
9337	B	3
9338	D	3
9339	E	3
9340	A	2
9341	B	5
9342	B	4
9343	A	4
9344	C	3
9346	E	3
9350	C	9
9351	D	7
9352	E	2
9353	C	2
9354	E	2
9355	C	2
9356	E	2
9357	D	2
9358	E	2
9360	A	6
9361	A	4
9362	B	4
9363	A	3
9365	B	5
9366	D	1
9367	A	1
9368	A	1
9850	B	2
9851	B	2

POWER BOARD Component side view



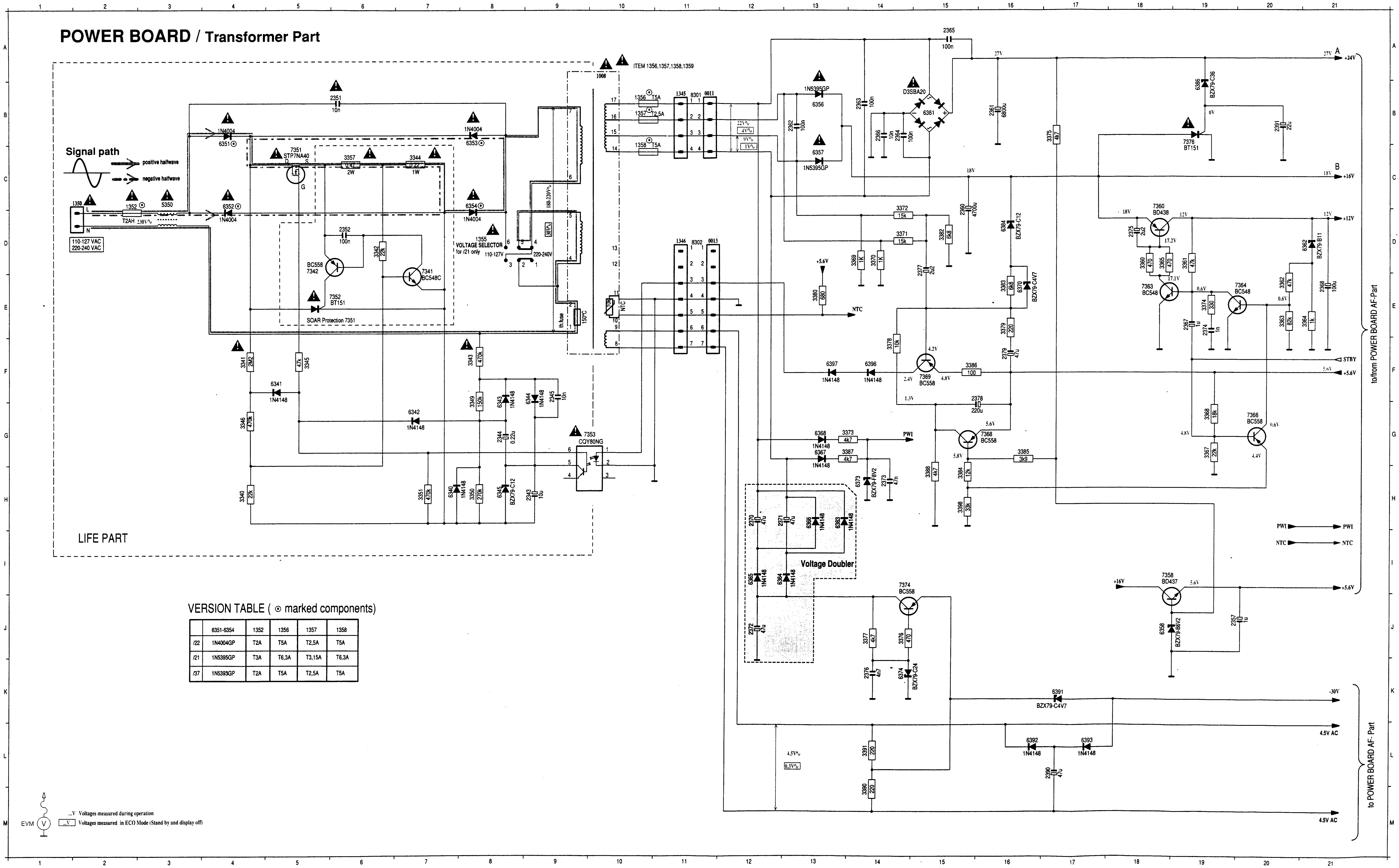
This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

Platinum Power Board .8 Component Layout 1996-05-08

CS 52 721

0011	B11
0013	D11
1008	A10
1345	B11
1346	D11
1350	D 1
1352	C 2
1355	D 8
1356	B10
1357	B10
1358	C10
1359	D10
1360	I21
2343	H 9
2344	G 8
2345	F 9
2351	B 6
2352	D 6
2356	B16
2357	J19
2358	J18
2359	B15
2360	C15
2361	B16
2362	B13
2363	B14
2364	B14
2365	A15
2366	B14
2367	E19
2368	E21
2369	G18
2370	H12
2371	H12
2372	J12
2373	H14
2374	E19
2375	D18
2376	K14
2377	D15
2378	F15
2379	F16
2390	L17
2391	B20
3339	F 4
3340	H 4
3341	F 4
3342	D 6
3343	F 8
3344	C 7
3346	G 4
3349	F 8
3350	H 8
3351	H 7
3345	F 5
3352	F 8
3357	C 6
3360	D18
3361	D19
3362	E20
3363	E20
3364	E21
3365	D18
3367	G19
3368	G19
3369	D14
3370	D14
3371	D14
3372	D14
3373	G14
3374	E19
3375	B17
3376	J14
3377	J14
3378	F14
3379	E16
3380	E13
3382	D15
3383	E16
3384	H15
3385	G16
3386	F15
3387	G14
3388	H15
3390	M14
3391	L14
3398	H15
3399	H19
5350	C 3
6340	H 7
6341	F 5
6342	G 7
6343	F 8
6344	F 9
6345	H 8
6350	J20
6351	B 4
6352	C 4
6353	B 8
6354	C 8
6356	B13
6357	C13
6358	J18
6359	I17
6361	B15
6362	D21
6363	H13
6364	I12
6365	I12
6366	H13
6367	G13
6368	G13
6369	F13
6370	E16
6373	H14
6374	K14
6375	G17
6384	D16
6386	B19
6391	K17
6392	L16
6393	L17
6394	C20
6395	D20
6396	F14
6397	F13
7341	D 7
7342	D 5
7351	C 5
7352	E 6
7353	H10
7357	H20
7358	I18
7359	G20
7360	C18
7363	E18
7364	E20
7365	G17
7366	G20
7368	G16
7369	F15
7374	I14
7376	B19
8306	C20
9360	K20
9361	H18
9362	I20
9363	H17
9365	K18

POWER BOARD / Transformer Part


1
2
3
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12
13
14
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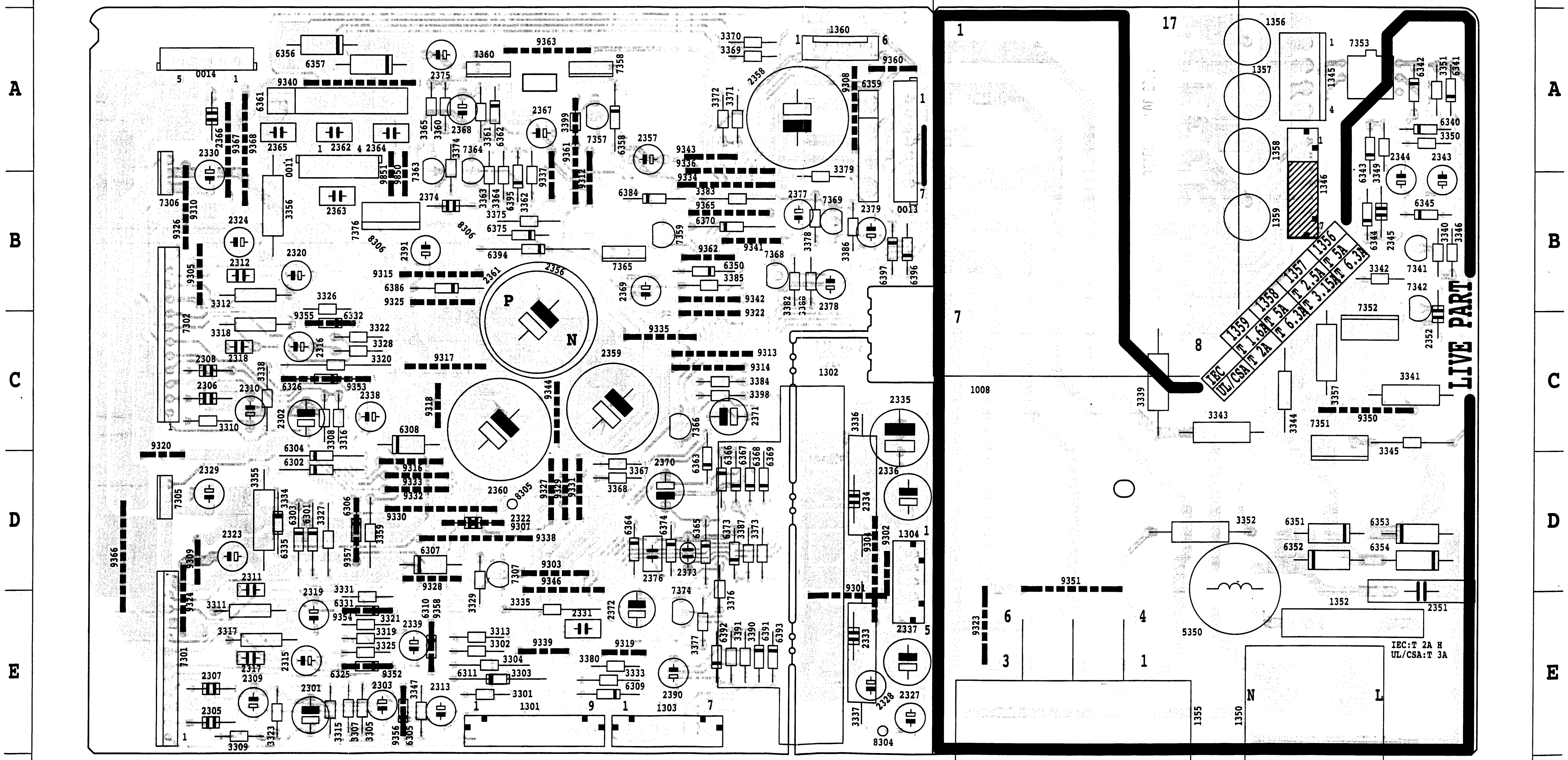
16
17
18
19
20
21
A
B
C
D
E
F
G
H
I
J
K
L
M
ITEM 1356,1357,1358,1359
Signal path
positive halfwave
negative halfwave
1350
L
N
110-127 VAC
220-240 VAC
1352
T2AH
5350
1N4004
6351
6352
6353
6354
2351
10n
7351
STP7NA40
3357
2W
3344
1W
2352
100n
BC558
7342
7341
BC548C
7352
BT151
SOAR Protection 7351
3342
22K
1355
VOLTAGE SELECTOR
for /21 only
110-127V
220-240V
th.fuse
150°C
1008
1356 T5A
1357 T2,5A
1358 T5A
1345
8301
0011
1346
8302
0013
NTC
3341
2M2
3345
47k
6341
1N4148
6342
1N4148
3346
470k
3340
22k
3343
470k
3349
150k
6343
1N4148
6344
1N4148
2345
10n
2344
0,22u
7353
CQY80NG
3351
470k
6340
1N4148
3350
270k
6345
BZX79-C12
2343
10u
LIFE PART
2365
100n
27V
A
+24V
1N5395GP
6356
6357
2362
100n
2363
100n
D3SBA20
6361
2366
10n
2364
100n
2361
6800u
3375
4k7
6386
BZX79-C36
0V
7376
BT151
2391
22u
18V
B
+16V
3372
15k
3371
15k
2360
4700u
3382
6k8
6384
BZX79-C12
7360
BD438
12V
+12V
2375
2u2
17,2V
3360
470
3365
470
3361
47k
6362
BZX79 B11
+5,6V
3369
1K
3370
1K
2377
2u2
3380
680
NTC
3383
6k8
6370
BZX79-C4V7
7363
BC548
17,1V
0,6V
3374
330
7364
BC548
3362
47k
2368
100u
2367
1u
2274
1n
3363
82k
3364
1k
3378
10k
3379
220
2379
47u
4,2V
6397
1N4148
6396
1N4148
7369
BC558
3386
100
STBY
+5,6V
2378
220u
6368
1N4148
3373
4k7
PWI
6367
1N4148
3387
4k7
7368
BC558
3385
3k9
3368
18k
7366
BC558
3367
22k
6373
BZX79-F8V2
2373
47n
3388
4k7
3384
12k
3398
33k
2370
47u
2371
47u
6366
1N4148
6363
1N4148
Voltage Doubler
6365
1N4148
6364
1N4148
2372
47u
7374
BC558
3377
4k7
3376
470
2376
4n7
6374
BZX79-C24
+16V
7358
BD437
5,6V
+5,6V
6358
BZX79-B6V2
2357
1u
PWI
NTC
to/from POWER BOARD AF-Part
6391
BZX79-C4V7
-30V
4.5V AC
6392
1N4148
6393
1N4148
2390
47u
3391
220
3390
220
4,5V∿
0,3V∿
to POWER BOARD AF- Part
EVM
V
...V Voltages measured during operation
...V Voltages measured in ECO Mode (Stand by and display off)

VERSION TABLE (⊙ marked components)

	6351-6354	1352	1356	1357	1358
/22	1N4004GP	T2A	T5A	T2,5A	T5A
/21	1N5395GP	T3A	T6,3A	T3,15A	T6,3A
/37	1N5393GP	T2A	T5A	T2,5A	T5A

0011 A 2	1357 A 8	2312 B 1	2330 B 1	2356 C 3	2370 D 4	3303 E 3	3319 E 2	3336 D 6	3351 A 9	3369 A 5	3384 C 5	6305 E 2	6342 A 9	6362 A 3	6391 E 5	7351 C 9	7376 B 2	9313 C 4	9328 D 2	9342 B 4	9361 A 4
0013 A 6	1358 A 8	2313 E 3	2331 E 4	2357 A 4	2371 C 5	3304 E 3	3320 C 2	3337 E 6	3352 D 8	3370 A 5	3385 B 4	6306 D 2	6343 A 9	6363 D 4	6392 E 5	7352 C 9	8304 E 6	9314 C 4	9329 D 3	9343 A 4	9362 B 4
0014 A 1	1359 B 8	2315 E 2	2333 E 5	2358 A 5	2372 E 4	3305 E 2	3321 E 2	3338 C 1	3355 D 1	3371 A 5	3386 B 5	6307 D 2	6344 B 9	6364 D 4	6393 E 5	7353 A 9	8305 D 3	9315 B 3	9330 D 3	9344 C 3	9363 A 3
1008 B 7	1360 A 5	2316 C 2	2334 D 5	2359 C 4	2373 D 4	3307 E 2	3322 C 2	3339 C 8	3356 B 1	3372 A 5	3387 D 5	6308 C 2	6345 B 9	6365 D 4	6394 B 3	7357 A 4	8306 B 2	9316 D 2	9331 D 4	9346 E 3	9365 B 5
1301 E 3	2301 E 2	2317 E 1	2335 C 6	2360 C 3	2374 B 3	3308 C 2	3323 E 1	3340 B 9	3357 C 9	3373 D 5	3388 B 5	6309 E 4	6350 B 4	6366 D 5	6395 B 3	7358 A 4	9301 E 5	9317 C 3	9332 D 2	9350 C 9	9366 D 1
1302 D 5	2302 C 2	2318 C 1	2336 D 6	2361 C 3	2375 A 3	3309 E 1	3325 E 2	3341 C 9	3359 D 2	3374 A 3	3390 E 5	6310 E 2	6351 D 9	6367 D 5	6396 B 6	7359 B 4	9302 D 6	9318 C 3	9333 D 2	9351 D 7	9367 A 1
1303 E 4	2303 E 2	2319 E 2	2337 E 6	2362 A 2	2376 D 4	3310 C 1	3326 B 2	3342 B 9	3360 A 3	3375 B 3	3391 E 5	6311 E 3	6352 D 9	6368 D 5	6397 B 6	7360 A 3	9303 D 3	9319 E 4	9334 B 5	9352 E 2	9368 A 1
1304 D 6	2305 E 1	2320 B 2	2338 C 2	2363 B 2	2377 B 5	3311 E 1	3327 D 2	3343 C 8	3361 A 3	3376 D 5	3398 C 5	6325 E 2	6353 D 9	6369 D 5	7301 E 1	7363 B 2	9304 D 6	9320 D 1	9335 C 4	9353 C 2	9850 B 2
1345 A 9	2306 C 1	2322 D 3	2339 E 2	2364 A 2	2378 B 5	3312 B 1	3328 C 2	3344 C 9	3362 B 3	3377 E 4	3399 A 4	6326 C 2	6354 D 9	6370 B 5	7302 C 1	7364 B 3	9305 B 1	9322 C 4	9336 B 5	9354 E 2	9851 B 2
1346 B 9	2307 E 1	2323 D 1	2343 B 9	2365 A 1	2379 B 6	3313 E 3	3329 D 3	3345 C 9	3363 B 3	3378 B 5	5350 D 8	6331 E 2	6356 A 2	6373 D 5	7305 D 1	7365 B 4	9307 D 3	9323 E 6	9337 B 3	9355 C 2	
1350 E 9	2308 C 1	2324 B 1	2344 B 9	2366 A 1	2390 E 4	3315 E 2	3331 E 2	3346 B 9	3364 B 3	3379 B 5	6301 D 2	6332 C 2	6357 A 2	6374 D 4	7306 B 1	7366 C 4	9308 A 5	9324 E 1	9338 D 3	9356 E 2	
1352 E 9	2309 E 1	2327 E 6	2345 B 9	2367 A 3	2391 B 2	3316 C 2	3333 E 4	3347 E 2	3365 A 2	3380 E 4	6302 D 2	6335 D 1	6358 A 4	6375 B 3	7307 D 3	7368 B 5	9309 D 1	9325 B 3	9339 E 3	9357 D 2	
1355 E 7	2310 C 1	2328 E 6	2351 E 9	2368 A 3	3301 E 3	3317 E 1	3334 D 1	3349 A 9	3367 D 4	3382 B 5	6303 D 2	6340 A 9	6359 A 6	6384 B 4	7341 B 9	7369 B 5	9310 B 1	9326 B 1	9340 A 2	9358 E 2	
1356 A 8	2311 E 1	2329 D 1	2352 C 9	2369 B 4	3302 E 3	3318 C 1	3335 E 3	3350 A 9	3368 D 4	3383 B 5	6304 D 2	6341 A 9	6361 A 2	6386 B 3	7342 B 9	7374 E 4	9312 B 4	9327 D 3	9341 B 5	9360 A 6	

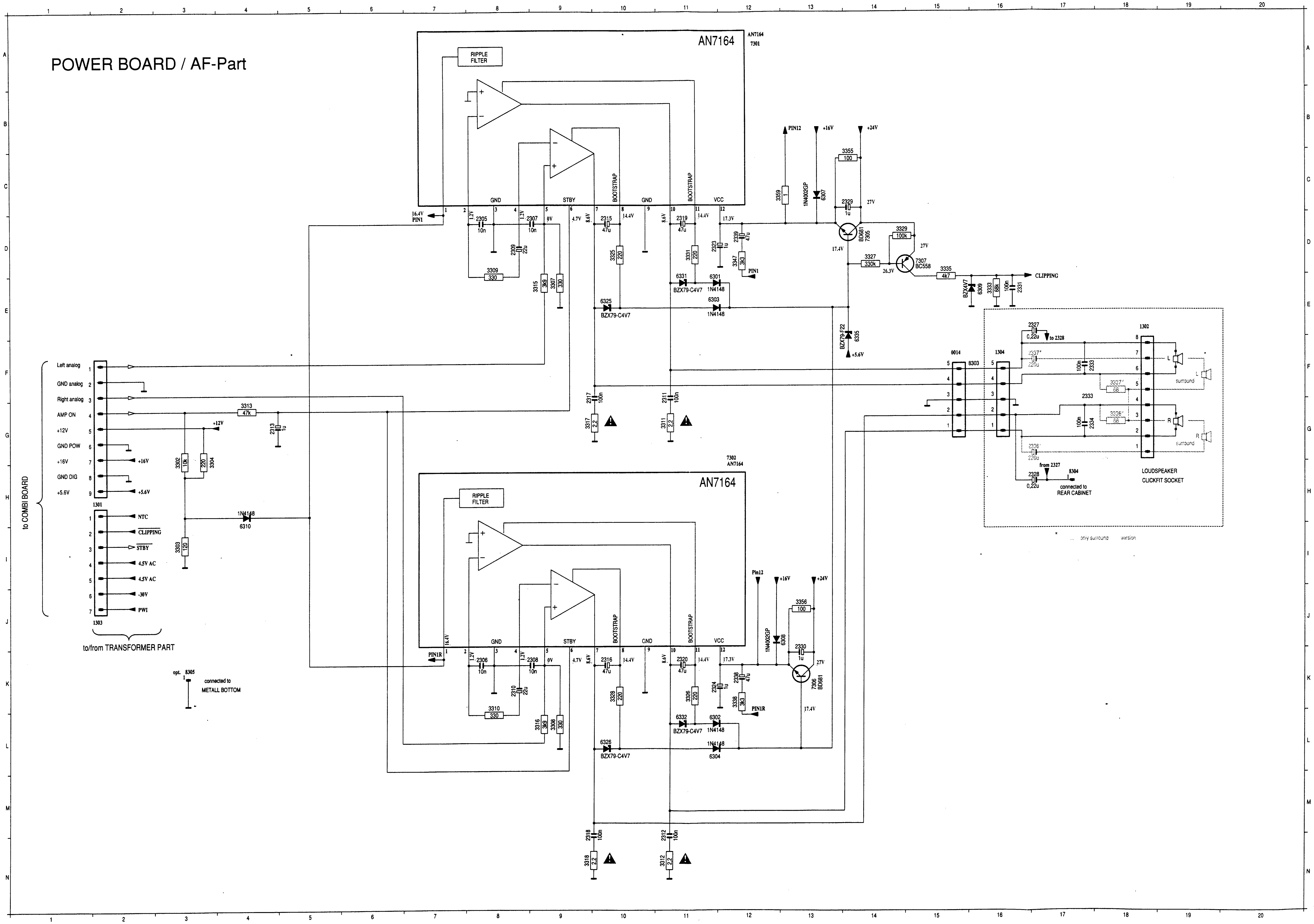
POWER BOARD Component side view


LIVE PART
1359 1358 1357 1356
IEC T 1.6A T 5A T 2.5A T 5A
UL/CSA T 2A T 6.3A T 3.15A T 6.3A
IEC:T 2A H
UL/CSA:T 3A
P
N
A
B
C
D
E

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

Platinum Power Board .8 Component Layout 1996-05-08

POWER BOARD / AF-Part


AN7164
7301
RIPPLE FILTER
GND
STBY
BOOTSTRAP
VCC
16.4V PIN1
2305 10n
2307 10n
2309 22u
3309 330
3315 3k9
3307 330
2315 47u
3325 220
2319 47u
3331 220
2323 1u
2339 47u
3347 3k3
PIN1
6331 BZX79-C4V7
6301 1N4148
6325 BZX79-C4V7
6303 1N4148
2317 100n
3317 2.2
2311 100n
3311 2.2
PIN12
+16V
+24V
3355 100
3359 1
1N4002GP 6307
2329 1u
27V
17.3V
17.4V
BD681 7305
3329 100k
3327 330k
26.3V
7307 BC558
3335 4k7
BZX4V7 6309
3333 68k
100n 2331
CLIPPING
BZX79-F22 6335
+5.6V
0014
8303
1304
1302
2327 0,22u
to 2328
2337* 220u
2333 100n
3337* 68
3336* 68
2334 100n
2336* 220u
L
R
surround
2328 0,22u
from 2327
8304
connected to REAR CABINET
LOUDSPEAKER CLICKFIT SOCKET
* ... only surround version
to COMBI BOARD
Left analog
GND analog
Right analog
AMP ON
+12V
GND POW
+16V
GND DIG
+5.6V
1301
NTC
CLIPPING
STBY
4.5V AC
4.5V AC
-30V
PWI
1303
to/from TRANSFORMER PART
3313 47k
2313 1u
3302 10k
3304 220
3303 120
1N4148 6310
opt. 8305
connected to METALL BOTTOM
7302
AN7164
PIN1R
2306 10n
2308 10n
2310 22u
3310 330
3316 3k9
3306 330
2316 47u
3328 220
2320 47u
3326 220
2324 1u
2338 47u
3338 3k3
PIN1R
6332 BZX79-C4V7
6302 1N4148
6326 BZX79-C4V7
6304 1N4148
Pin12
3356 100
1N4002GP 6308
2330 1u
7306 BD681
2318 100n
3318 2.2
2312 100n
3312 2.2
1.2V
0V
4.7V
8.6V
14.4V
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
A B C D E F G H I J K L M N

0014	F15
1301	H 1
1302	E18
1303	J 1
1304	F16
2301	D 7
2302	K 7
2303	D 7
2305	D 8
2306	K 8
2307	D 9
2308	K 9
2309	D 8
2310	K 8
2311	F11
2312	N11
2313	G 4
2315	D10
2316	K10
2317	F 9
2318	N 9
2319	D11
2320	K11
2322	F 3
2323	D11
2324	K11
2327	E17
2328	H17
2329	C14
2330	K13
2331	E16
2333	E17
2334	G17
2335	H18
2336	G17
2337	F17
2338	K12
2339	D12
3301	D 7
3302	G 3
3303	I 3
3304	G 3
3305	E 7
3307	E 9
3308	L 9
3309	D 8
3310	K 8
3311	G11
3312	N11
3313	G 4
3315	E 9
3316	L 9
3317	G 9
3318	N 9
3319	F12
3320	M12
3321	E12
3322	L12
3323	E 8
3325	D10
3326	K11
3327	D14
3328	K10
3329	D14
3331	D11
3333	E16
3334	E14
3335	D15
3336	G18
3337	F18
3338	K12
3347	D12
3355	C14
3356	J13
3359	C12
6301	E11
6302	L11
6303	E11
6304	L11
6305	D 5
6306	J 5
6307	C13
6308	J13
6309	E16
6310	H 4
6311	I 3
6325	E10
6326	L10
6331	E11
6332	L11
6335	E14
7301	A12
7302	G12
7305	D14
7306	K13
7307	D15
8304	H17
8305	K 3
9301	F17
9302	G17
9304	F17
9307	F 3
9309	C14
9310	J13
9352	E10
9353	L10
9354	D11
9355	L11
9356	D 5
9357	J 5
9358	H 4

ELECTRICAL PARTSLIST POWER BOARD

MISCELLANEOUS

	4822 255 40179	SPRING CLIP TO220	
	4822 492 71733	SPRING CLIP AN7164	
	4822 492 71734	SPRING CLIP T0126	
	4822 492 11068	CLIP RECTIFIER	
	4822 255 40179	SPRING CLIP TO220	
	4822 492 71733	CLIP AN7164	
	4822 492 71734	SPRING CLIP T0126	
1008	4822 146 21841	TRANSFORMER	not for /37
1008	4822 146 21847	TRANSFORMER	/37 only
1302	4822 267 31107	LS-TERMINAL	for surround versions
1302	4822 267 31176	LS-TERMINAL	not for surround versions
1350	4822 265 31015	MAINS SOCKET	not for /37
1350	4822 265 31016	MAINS SOCKET	/37 only
1352	4822 252 11136	FUSE 3,0A	/37 only
1352	5322 253 30373	FUSE 2A	not for /37
1355	4822 272 10269	VOLTAGE SELECTOR	/21 only
1356	4822 071 55002	FUSE T5A	not for /37
1356	4822 252 51123	FUSE T6,3A	/37 only
1357	4822 071 52502	FUSE T 2,5A	not for /37
1357	4822 252 51121	FUSE 3,15A	/37 only
1358	4822 071 55002	FUSE T5A	not for /37
1358	4822 252 51123	FUSE T6,3A	/37 only

CAPACITORS

2305	4822 121 51387	10nF	20%	16V
2306	4822 121 51387	10nF	20%	16V
2307	4822 121 51387	10nF	20%	16V
2308	4822 121 51387	10nF	20%	16V
2309	4822 124 41596	22µF	20%	50V
2310	4822 124 41596	22µF	20%	50V
2311	5322 121 42386	100nF	5%	63V
2312	5322 121 42386	100nF	5%	63V
2313	4822 124 40242	1µF	20%	63V
2315	4822 124 40433	47µF	20%	25V
2316	4822 124 40433	47µF	20%	25V
2317	5322 121 42386	100nF	5%	63V
2318	5322 121 42386	100nF	5%	63V
2319	4822 124 40433	47µF	20%	25V
2320	4822 124 40433	47µF	20%	25V
2323	4822 124 40242	1µF	20%	63V
2323	4822 124 41579	10µF	20%	50V
2324	4822 124 40242	1µF	20%	63V
2324	4822 124 41579	10µF	20%	50V
2327	4822 124 40746	0,22µF	20%	63V
2328	4822 124 40746	0,22µF	20%	63V
2329	4822 124 40242	1µF	20%	63V
2329	4822 124 41579	10µF	20%	50V
2330	4822 124 40242	1µF	20%	63V
2330	4822 124 41579	10µF	20%	50V
2331	5322 121 42386	100nF	5%	63V
2333	4822 126 12882	100nF	20%	50V
2334	4822 126 12882	100nF	20%	50V
2336	4822 124 41992	220µF		35V
2337	4822 124 41992	220µF		35V
2338	4822 124 40433	47µF	20%	25V
2339	4822 124 40433	47µF	20%	25V
2343	4822 124 41579	10µF	20%	50V
2344	4822 124 40746	0,22µF	20%	63V
2345	4822 121 51387	10nF	20%	16V

CAPACITORS

2351	4822 126 13637	10nF	10%	1000V
2352	4822 126 12882	100nF	20%	50V
2357	4822 124 40242	1µF	20%	63V
2360	4822 124 42119	4700µF	20%	25V
2361	4822 124 11516	6800µF	20%	35V
2362	5322 121 42386	100nF	5%	63V
2363	5322 121 42386	100nF	5%	63V
2364	5322 121 42386	100nF	5%	63V
2365	5322 121 42386	100nF	5%	63V
2366	4822 121 51387	10nF	20%	16V
2367	4822 124 40242	1µF	20%	63V
2368	4822 124 41525	100µF	20%	25V
2370	4822 124 80196	47µF	20%	50V
2371	4822 124 80196	47µF	20%	50V
2372	4822 124 80196	47µF	20%	50V
2373	4822 121 43526	47nF	5%	100V
2374	4822 122 33197	1nF	10%	50V
2375	4822 124 41576	2,2µF	20%	50V
2376	4822 126 11005	4,7nF		50V
2377	4822 124 41576	2,2µF	20%	50V
2378	4822 124 40196	220µF	20%	16V
2379	4822 124 40433	47µF	20%	25V
2390	4822 124 40433	47µF	20%	25V
2391	4822 124 41596	22µF	20%	50V

RESISTORS

3302	4822 116 83864	10kΩ	5%	0,5W
3303	4822 116 52206	120Ω	5%	0,5W
3304	4822 116 83872	220Ω	5%	0,5W
3307	4822 116 52219	330Ω	5%	0,5W
3308	4822 116 52219	330Ω	5%	0,5W
3309	4822 116 52219	330Ω	5%	0,5W
3310	4822 116 52219	330Ω	5%	0,5W
3311	4822 052 10228	2,2Ω	5%	0,33W
3312	4822 052 10228	2,2Ω	5%	0,33W
3313	4822 116 52284	47kΩ	5%	0,5W
3315	4822 116 52276	3,9kΩ	5%	0,5W
3316	4822 116 52276	3,9kΩ	5%	0,5W
3317	4822 052 10228	2,2Ω	5%	0,33W
3318	4822 052 10228	2,2Ω	5%	0,33W
3325	4822 116 83872	220Ω	5%	0,5W
3326	4822 116 83872	220Ω	5%	0,5W
3327	4822 116 52272	330kΩ	5%	0,5W
3328	4822 116 83872	220Ω	5%	0,5W
3329	4822 116 52234	100kΩ	5%	0,5W
3329	4822 116 83878	270kΩ	5%	0,5W
3331	4822 116 83872	220Ω	5%	0,5W
3333	4822 116 52297	68kΩ	5%	0,5W
3335	4822 116 52283	4,7kΩ	5%	0,5W
3336	4822 117 11782	68Ω	5%	
3337	4822 117 11782	68Ω	5%	
3338	4822 116 52269	3,3kΩ	5%	0,5W
3339	4822 053 21106	10MΩ	5%	0,5W
3340	4822 116 52257	22kΩ	5%	0,5W
3341	4822 053 21225	2,2MΩ	5%	0,5W
3342	4822 116 52257	22kΩ	5%	0,5W
3343	4822 053 21474	470kΩ	5%	0,5W
3344	4822 117 11744	0,22Ω	5%	1W
3345	4822 116 52284	47kΩ	5%	0,5W
3346	4822 116 52285	470kΩ	5%	0,5W
3347	4822 116 52269	3,3kΩ	5%	0,5W

ELECTRICAL PARTSLIST POWER BOARD

RESISTORS

3349	4822 116 52245	150kΩ	5%	0,16W
3350	4822 116 83878	270kΩ	5%	0,5W
3351	4822 116 52285	470kΩ	5%	0,5W
3355	4822 053 11101	100Ω	5%	2W
3356	4822 053 11101	100Ω	5%	2W
3357	4822 117 12318	0,47Ω	5%	0,5W
3359	4822 116 80176	1Ω	5%	0,5W
3360	4822 116 52224	470Ω	5%	0,5W
3361	4822 116 52284	47kΩ	5%	0,5W
3362	4822 116 52284	47kΩ	5%	0,5W
3363	4822 116 52304	82kΩ	5%	0,5W
3364	4822 050 11002	1kΩ	5%	0,2W
3365	4822 116 52224	470Ω	5%	0,5W
3367	4822 116 52257	22kΩ	5%	0,5W
3368	4822 116 52251	18kΩ	5%	0,5W
3369	4822 050 11002	1kΩ	5%	0,2W
3370	4822 050 11002	1kΩ	5%	0,2W
3371	4822 116 52244	15kΩ	5%	0,5W
3372	4822 116 52244	15kΩ	5%	0,5W
3373	4822 116 52283	4,7kΩ	5%	0,5W
3374	4822 116 52219	330Ω	5%	0,5W
3375	4822 116 52283	4,7kΩ	5%	0,5W
3376	4822 116 52224	470Ω	5%	0,5W
3377	4822 116 52283	4,7kΩ	5%	0,5W
3378	4822 116 83864	10kΩ	5%	0,5W
3379	4822 116 83872	220Ω	5%	0,5W
3380	4822 116 52228	680Ω	5%	0,5W
3382	4822 116 52296	6,8kΩ	5%	0,5W
3383	4822 116 52296	6,8kΩ	5%	0,5W
3384	4822 116 52238	12kΩ	5%	0,16W
3385	4822 116 52276	3,9kΩ	5%	0,16W
3386	4822 116 52175	100Ω	5%	0,5W
3387	4822 116 52283	4,7kΩ	5%	0,5W
3388	4822 116 52283	4,7kΩ	5%	0,5W
3390	4822 116 83872	220Ω	5%	0,5W
3391	4822 116 83872	220Ω	5%	0,5W
3398	4822 116 52271	33kΩ	5%	0,5W

COILS

5350	4822 157 71285	400µH

DIODES

6301	4822 130 30621	1N4148	
6302	4822 130 30621	1N4148	
6303	4822 130 30621	1N4148	
6304	4822 130 30621	1N4148	
6307	5322 130 30684	1N4002	
6308	5322 130 30684	1N4002	
6309	4822 130 34174	BZX79-B4V7	
6310	4822 130 30621	1N4148	
6325	4822 130 34174	BZX79-B4V7	
6326	4822 130 34174	BZX79-B4V7	
6331	4822 130 34174	BZX79-B4V7	
6332	4822 130 34174	BZX79-B4V7	
6335	4822 130 34441	BZX79-F22	
6340	4822 130 30621	1N4148	
6341	4822 130 30621	1N4148	
6342	4822 130 30621	1N4148	
6343	4822 130 30621	1N4148	
6344	4822 130 30621	1N4148	
6345	4822 130 34197	BZX79-C12	
6351	4822 130 83362	1N4004GP	for /22 only

DIODES

6351	4822 130 83928	1N5395GP	not for /37
6351	4822 130 83929	1N5393GP	for /37 only
6352	4822 130 83362	1N4004GP	for /22 only
6352	4822 130 83928	1N5395GP	not for /37
6352	4822 130 83929	1N5393GP	for /37 only
6353	4822 130 83362	1N4004GP	for /22 only
6353	4822 130 83928	1N5395GP	not for /37
6353	4822 130 83929	1N5393GP	for /37 only
6354	4822 130 83362	1N4004GP	for /22 only
6354	4822 130 83928	1N5395GP	not for /37
6354	4822 130 83929	1N5393GP	for /37 only
6356	4822 130 83928	1N5395GP	
6357	4822 130 83928	1N5395GP	
6358	4822 130 34167	BZX79-B6V2	
6361	4822 130 82079	DIODE BRIDGE D3SBA20	
6362	4822 130 34488	BZX79-C11	
6363	4822 130 30621	1N4148	
6364	4822 130 30621	1N4148	
6365	4822 130 30621	1N4148	
6366	4822 130 30621	1N4148	
6367	4822 130 30621	1N4148	
6368	4822 130 30621	1N4148	
6370	4822 130 34174	BZX79-B4V7	
6373	4822 130 34382	BZX79-C8V2	
6374	4822 130 34398	BZX79-C24	
6384	4822 130 34197	BZX79-C12	
6386	4822 130 34368	BZX79-C36	
6391	4822 130 34174	BZX79-B4V7	
6392	4822 130 30621	1N4148	
6393	4822 130 30621	1N4148	
6396	4822 130 30621	1N4148	
6397	4822 130 30621	1N4148	

TRANSISTORS

7305	5322 130 44786	BD681
7306	5322 130 44786	BD681
7307	5322 130 60068	BC558C
7341	4822 130 44196	BC548C
7342	5322 130 60068	BC558C
7351	4822 130 63925	STP7NA40 POWER FET
7352	5322 130 24081	BT151-500R
7358	4822 130 40982	BD437
7360	4822 130 40995	BD438
7363	4822 130 44196	BC548C
7364	4822 130 44196	BC548C
7366	5322 130 60068	BC558C
7368	5322 130 60068	BC558C
7369	5322 130 60068	BC558C
7374	5322 130 60068	BC558C
7376	5322 130 24081	BT151-500R

INTEGRATED CIRCUITS

7301	4822 209 90411	AN7164
7302	4822 209 90411	AN7164
7353	4822 130 91451	CQY80NG